JUN 21 1922

THE INDUSTRIAL ARTS MAGAZINE

GENERA
JU
UNI OF MICH.

JULY · 1922

THE BRUCE PUBLISHING CO
MILWAUKEE · WISCONSIN

PEDRO J. LEMOS

ATKINS SILVER STEEL SAWS

QUALITY SAWS SAW TOOLS AND MACHINE KNIVES

should be given consideration from now on, because quality means economy in the end.

The highest in quality, quality considered, is the lowest in price, namely—

ATKINS SILVER STEEL SAWS

Saw Tools and Machine Knives. Everywhere they are known as,

"The Finest On Earth"

Send for this free literature: "How To Care For And Use Cross Cut And Hand Saws," "Saw Fitting For Best Results," "Saw Sense," "Pruning And Pruning Saws." For twenty-five cents, we will send a carpenter's nail apron and carpenter's pencil by parcel post. Address us at Indianapolis.

E.C. ATKINS & CO.

ESTABLISHED 1857 THE SILVER STEEL SAW PEOPLE

Home Office and Factory, INDIANAPOLIS, INDIANA

Canadian Factory, Hamilton Ontario

Machine Knife Factory, Lancaster N.Y.

Branches Carrying Complete Stocks In The Following Cities:

Atlanta	New Orleans	Seattle
Memphis	New York City	Paris, France
Chicago	Portland, Ore.	Sydney, N. S. W.
Minneapolis	San Francisco	Vancouver, B.C.

INDUSTRIAL-ARTS MAGAZINE

Volume XI JULY, 1922 No. 7.

Results of an Inquiry Concerning Certain Phases of Junior High School Industrial Arts

Kenneth V. Carman, Columbia University, New York City

The Purpose of the Inquiry.

The need has been felt on the part of many interested in the Industrial Arts for junior high schools that administrators, supervisors and teachers define specifically the real aims and objectives for this phase of school work. It is of fundamental importance that educators have clearly in mind the true functions of the industrial arts for this period, and strive to make the schools conform to ways and means by which these aims may be realized.

There have also been contentions concerning problems in the manner of conducting industrial arts in the seventh, eighth and ninth years.

One of these problems, where there seems to be a difference of opinions, is the types of shops best suited to accomplish aims and purposes. Because of these varied opinions among those interested in the junior high school industrial arts, it was thought that a careful study should be made of these many contentions. It is believed that such an investigation might prove helpful in solving some of these problems.

In order to arrive at some definite conclusions, it was thought best, as a part of the study, to secure opinions from various authorities concerning these questions. Consequently an inquiry was drawn up for the purpose of laying before some of those interested in this field of school work, questions relating to types of shops, aims and objectives to be sought, together with three or four other less important problems of the industrial arts for the seventh, eighth and ninth years.

To Whom Inquiries Were Sent.

Two hundred and twenty-five of these inquiries were sent to representative persons in 43 states of the country. In order that a consensus of opinion might be possible, care was taken to include those engaged in various phases of school work, such as professors and heads of departments in colleges and normal schools, federal and state specialists, supervisors and directors; city supervisors, vocational directors, teachers and supervisors in small communities, and others engaged in the field of general education. One hundred and fifty-two of these inquiries have been returned and tabulated.

Nature of the Inquiry.

The inquiry was divided into *two parts*. In the *first* part there were five questions as follows:

I and II. *The problem of types of shops for industrial arts work in communities of various sizes.*

III. Question relative to whether or not a definite course for a definite period of time should be favored.

IV. Question as to whether industrial arts should be required of *all* pupils in the seventh, eighth and ninth years.

V. 1. Question concerning the largest number of boys for one teacher in a diversified (many activities) shop.

2. Suggested means, methods, or devices helpful in conducting the one-teacher, many-activities shop.

The *second* part of the inquiry related to *aims and objectives* to be sought. Twelve excerpts were presented representing different opinions concerning the functions of this phase of school work. From these excerpts a first, second and third choice were obtained. Space was provided for each so desiring to indicate his own opinion of the true functions of industrial arts for junior high schools.

Results of the Inquiry.

In order to simplify the results concerning some of the questions, graphic tabulation with comparative percentages are given, so that the reader may more easily note the consensus of opinions of representative persons interested in junior-high-school industrial arts.

It will be noted that for small communities up to 15,000, a large majority of those answering the inquiry are in favor of one shop in which all phases or units of industrial activities should be carried on.

For cities from 15,000 to 50,000, a majority favor separate shops; however, the preference for separate shops is not so decidedly marked for cities of this size, as is the case for larger cities.

For the larger cities, a large majority favor the separate shop idea.

Comparing Figures I and II, it will be noted that the percentages approximately correspond inversely as would be expected, excepting a slightly larger percentage of persons who favor separate shops. This is taken

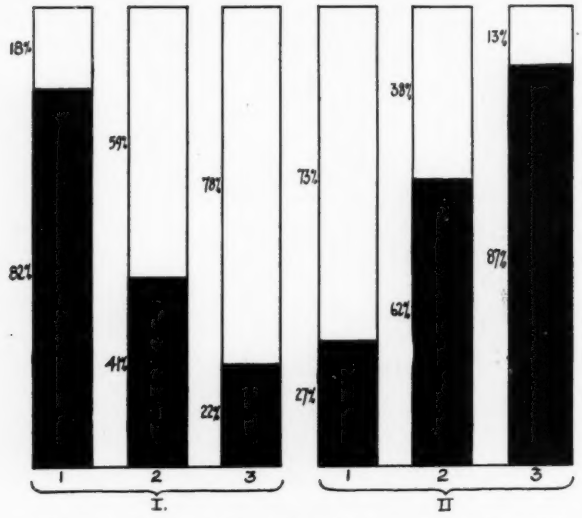


Figure I. Relative percentages of persons favoring ONE large diversified shop. Those answering YES, in black.

I.

1.	For small communities up to 15,000..	yes. 82%	No. 18%
2.	For cities from 15,000 to 50,000.....	yes. 41%	No. 59%
3.	In larger cities.....	yes. 22%	No. 78%

Figure II. Relative percentages of persons favoring SEPARATE shops for each phase or unit of industrial activity.

II.

1.	For small communities up to 15,000..	yes. 27%	No. 73%
2.	For cities from 15,000 to 50,000	yes. 62%	No. 38%
3.	For larger cities	yes. 87%	No. 13%

to indicate that a few answering the inquiry, while favoring the *one* shop idea, also favor *separate* shops.

Remarks Concerning Types of Shops. (Question I. and II.)

In addition to answering *"yes"* or *"no"* regarding the favoring of types of shop for communities of different sizes, as tabulated above, space was reserved for remarks. A few of these expressions of opinion might be of interest.

A well known western professor and writer does not approve of one large shop. He believes in separate shops for *all* communities regardless of population. However, he "favors placing related shop subjects in one room, not unrelated, as printing and woodwork". If "rightly comprehended" he is "not in favor of the diversified shop idea" of a leading eastern professor. Further, in answering the inquiry, he "does not have the Pittsburgh idea of putting woodwork, printing, electricity, etc., all in one room, and over twenty boys". He believes it is unfortunate "for the teacher, and creates vicious habits—industrial habits for boys; is worse than the formalism of traditional type it is supposed to supplant. There is a reasonable 'mean'."

A State Supervisor of Trade and Industrial Education in the East, is in favor of *one* large diversified shop in *all* sized communities. He writes that this type of shop "has always been of interest to him. The success depends entirely on the teacher; and teachers who are willing and able to undertake work of this kind are very difficult to secure."

A professor in a large university in the east is in favor of *one* large shop for all communities up to 50,000. For larger cities, this professor also answers "Yes" unless classes have to be so large that appropriate facilities cannot be made adequate. Duplicate general shops little more expensive than necessary number of unit shops. In general shop, however, probably not possible to have as many students in a class as in unit work."

A leading state director of the east, is in favor (*yes*) of *one* large shop in small communities only "if necessary", and is in favor of separate shops for small communities "if possible". He is strongly in favor of separate shops "where the number of students justifies the expense".

A superintendent of a community school in Minnesota, favors *one* large shop for small community up to 15,000, but is for separate shops in all cities above 15,000. He recommends "four shops of different types (1) woodwork, (2) forge, (3) automobile mechanic, (4) printing.

A teacher in an eastern school where the most modern conceptions of education are being successfully carried out, makes a statement which is well not to forget and is worthy of consideration. He is in favor of *one* large diversified shop and is not in favor of separate shops,—"not if you put the boy first".

One of the best known industrial education administrators of a large eastern city is in favor of the large shop in small communities. He is not in favor of such a shop in cities from 15,000 to 50,000 "if city is an industrial city". For large cities he is in favor of the *one* diversified shop for the seventh grade; but separate shops should be available for eighth and ninth years.

A state commissioner of vocational education of the Pacific coast, is positive in favoring *one* large shop "regardless of size of community".

A California supervisor is in favor of *one* large shop in communities up to 50,000. He adds that difficulty will lie in securing instructors of sufficient range.

An industrial education man of national reputation writes that "all specialized shops should have some equipment or pupils should have access to shops whereby it would be possible to combine two or more different kinds of material (i. e. wood and sheet metal) in a given project."

One of the most widely-known men in this field of work voices a very common remark when he writes that "it takes a very strong teacher to be successful under the one-shop-many-activities conditions".

For cities from 15,000 to 50,000, an administrator of one of the largest cities in the east, is not in favor of "more than two activities per room". He "believes in rotation of activities just because a short time is available for each field, each should be intensively pursued. Pupils should have free access to other rooms at all times with skilled mechanics in each rather than Jack-of-all-trades in a room with all activities".

An eastern state supervisor outlines a logical workable plan "for small communities" he favors "one large shop; for cities from 15,000 to 50,000, "probably two" shops. In larger cities "shops grouping activities".

He remarks that "it might be well to have pupils enter a composite shop and then transfer to the unit shop after trying out various types of work".

A head of an industrial-arts department in a large middle western normal school favors the *one* shop in cities up to 50,000, but "questions" in larger cities, "depends on number of junior high schools in city". "Prefer group shops in large communities if possible." He refers to Rochester, N. Y., and School No. 64, New York City, as examples.

A number of those answering the inquiry would have the question of type of shops dependent on enrollment of school rather than on size of community. For example, if enrollment "is 600 or more, have at least two shops".

Part I.

Question III. "Would you favor a course of study whereby pupils would be required to take certain definite work for a certain definite period of time, so as to have definite progress before advancing into the next industrial activity?"

FIG. III.

Figure III. Chart showing relative percentage of persons favoring a definite course of study in answer to question III.

The tabulation of answers to Question III (Fig. III) indicate a large percentage of persons favoring a definite course of study for the Junior High School period. A number of persons did not favor such a definite course for the ninth year.

Remarks Accompanying Answers to Question III. (Fig. III).

A well known federal authority in industrial education is in favor of a definite course of study, but sufficiently flexible to provide for exceptions.

A director of manual training in a large middle western city is in favor in the seventh and eighth; advocates elective course in ninth.

A vocational guidance specialist of a middle Atlantic state does not answer with "Yes" or "No" but is of the opinion that "arrangement should be such that a student could by extra effort complete prescribed work in variable time units".

A supervisor of industrial arts in a large city in Maine writes,—"I would favor having pupils advance as fast as possible."

An Illinois professor and a well-informed industrial arts man answers "YES with advancement depending on accomplishment."

A Texas normal school instructor writes—"Most assuredly—and neither of the above types of shops (referring to Question 1 and II) precludes this as possibility".

A well known leader in this field in the east is "in favor of a set of 'minimum requirements' to be used as a basis of definite progression. I am not in favor of a course of projects".

A progressive instructor of Georgia remarks *"yes.* Failure to meet requirements in one activity not to necessarily bar students from other activities in shop work".

Part I.

Question IV. Should industrial work be required of all junior high school boys regardless of their desires or future life work? Answer yes or no.

1. In the 7th year. 2. In the 8th year. 3. In the 9th year.

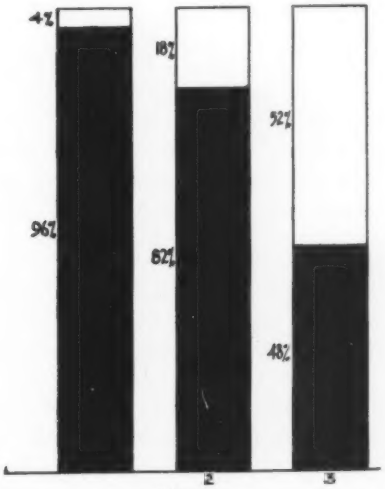


FIG. IV.

Figure IV. Comparative percentages of persons in favor of requiring Industrial Arts of all boys regardless of their desires or future life work.

1. In the 7th year.....	Yes 96%	No. 4%
2. In the 8th year.....	Yes 82%	No. 18%
3. In the 9th year.....	Yes 48%	No. 52%

Figure IV relative to whether or not industrial-arts work should be required of *all* boys indicates that most persons are in "favor" for the 7th year. For the eighth year there is a substantial majority in favor of having all boys take industrial arts. A number answering this question would require the work until the middle of the eighth year. For the ninth year, a small majority would favor industrial arts being elective.

Question V. Assume one teacher in charge of a class of a number of boys. Assume one shop in which a number of different industrial activities are carried on.

What is the largest number of boys that one teacher can probably handle utilizing blueprints, instruction sheets, foreman idea, group system, etc.

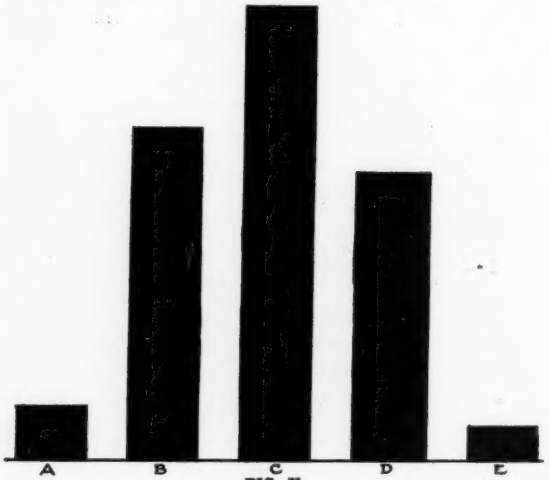


FIG. V.

Figure V. Comparative number of persons favoring largest number of boys for one teacher in a diversified shop.

A	8—14 pupils	6 persons
B	15—19 pupils	38 persons
C	20	51 persons
D	24—25	33 persons
E	30—50	5 persons

Figure V indicates the relative number of persons favoring classes numbering from fifteen to twenty-five boys. It will be noted that those favoring twenty are greater than the combined numbers of persons favoring from fifteen to nineteen, and from twenty-four to twenty-five. The result of these questions reveal a decided tendency to have classes approximate twenty boys. Variation above and below this number is dependent on the ability of the teacher and the organization.

An example in variation in number of pupils dependent on the teacher is indicated by a professor and editor "Assuming that the teacher is an efficient executive, 20-25, but under usual conditions fifteen is enough".

The second part of this question (V) asking for opinions of methods and devices whereby the one teacher in a diversified shop, could be carried out, brought out but a very few additional suggestions other than those indicated in the question itself. However, some of these are presented.

A shop supervisor, in one of the large eastern cities writes: "Each boy taking turn in tool room spending entire time on this and nothing else."

A Pacific coast supervisor of manual Training writes: "We have five differentiated shops in *successful* operation. We follow the group plan, use foremen to some extent, use blue prints and drawings. The success of the work depends on a wide-awake teacher."

The head of an eastern vocational school suggests the "boy scout idea using the boy scout handbook as a textbook." He argues for boy scout merit badges to replace school "marks". "Let every industrial-arts teacher become a scout master."

A western normal school man in offering a helpful "means" sends a general suggestion—"A school to train efficient teachers." Whether it should be "a" school or "some" school, the idea is worthy of thought, and opens up the problem of proper teacher training,—a topic that should be carefully considered in all its ramifications.

A supervisor of a progressive eastern state wisely suggests, "systematic arrangement of tools and equipment, carefully prepared lesson sheets, lesson plans, organized teaching material, ample equipment and supplies, trained teachers, and proper supervision."

A leading editor and professor of the middle west thinks: "the workman and helper plan a good one where two work at a job, one as helper for a considerable time; then the workman moves on and the helper becomes workman. Plan has been successful in secondary school classes."

An assistant superintendent of schools in a large eastern city would give students "rating as helpers, apprentices, journeymen, master workmen, etc., check sheet for each boy where credits may be entered (time and job slips) etc."

A well-informed Minnesota man suggests "special teachers who have been working mechanics in that trade—even if one has to hire mechanics for short periods in addition to the work of a coordinator".

A supervisor of a large city in Nebraska writes: "use the laboratory method of specific instruction sheets, illustrations, and equipment for each experiment."

Another leading Minnesota authority remarks: "use student helpers." "We had one shop where a high grade teacher handled 60 by using student foremen; work must be perfectly organized to do this."

An eastern professor and an authority on vocational guidance suggests "problem sheet, job sheets, home projects, outside work, student government; also the kind of legitimate educational bribery which says to children,—if you will use this shop rightly you can stay; otherwise we will go back to a formalized plan."

A number suggest the appointment of members of previous class to act as assistants. Others suggest intermingling of the grades, the upper grades (eighth and ninth) to assist and act as foremen.

Part II of Inquiry—Aims and Objectives.

The second part of the inquiry was an attempt to get a consensus of opinion as to the real *objectives* to be sought in the industrial-arts work for this period. To accomplish this, a number of excerpts were selected from over one hundred statements of aims of reputable educators.

The statement receiving a substantial majority and which was number twelve (No. 12) or the last on the inquiry, was accepted by almost four times as many as the next highest statement. It was taken from the Eastern Arts Association proceedings of 1916, page 46. The same article appeared in "School and Society," Vol. 4, 1916, page 318. The article "Industrial Education

in Present School Problems", treats the subject in seven phases, one of which "industrial arts for the intermediate or junior high school", contained the last statement on the inquiry (number 12).

Of the twelve excerpts the fourth in order on the inquiry received the next highest number of first choices. It was taken from the Proceedings of the Eastern Arts Association, Springfield Meeting, 1916, page 178.

Excerpt number five ranked third and was found in the Rochester, N. Y., Junior High School Course of Study 1916, page 143.

The ninth excerpt in the inquiry which ranks a close fourth was taken from the INDUSTRIAL-ARTS MAGAZINE for September, 1920 (Vol. IX, No. 9).

The other eight excerpts were chosen by a comparatively smaller number of persons answering the inquiry. A copy of the second part of the inquiry on aims and objectives, as it was sent out, with the excerpts in their original order, is given below. The large figures at the left of each excerpt indicate the rank or preference according to 152 persons making returns.

Aims and Objectives of the Industrial Arts in Junior High Schools.

Certain educators of different sections of the country have defined what they considered to be the aims and values which control this phase of school activity in the junior high school period. Below is a list of excerpts. Will you kindly place the figure (1) in the margin at the left of the statement which seems *nearest your own idea* as to the purpose and objectives of the work; place the figure (2) in the margin at the left of the *statement which you would place second;* and the figure (3) for the *statement you consider third?* Please cross out any statements which seem wholly irrelevant or inadequate. In case none of the statements seem to represent the true function of the work, will you kindly give in the space reserved at X your own opinion?

Rank

No. 1.

11 "The purpose of manual training is mental training through the hand and eye, just as the study of history is mental training through the memory and other powers."

No. 2.

6 "The manual arts is not to train carpenters, but to develop the mental, moral and physical powers of children. It gives a taste for rough labor as distinguished from clerkly accomplishment; it cultivates manual dexterity, self reliance, accuracy, carefulness, patience, perseverance and especially does it train the faculties of attention and develop the power of concentration."

No. 3.

9 "Manual training serves as a means to educate the individual on many sides by giving him different angle perspectives and by familiarizing him with world materials which the classroom subjects alone cannot do."

No. 4.

2 "The specific purpose of the manual arts . . . is to lay a broad foundation of experience and information that will assist each pupil to interpret the social forces at work in his environment to the end that he may make a wise and intelligent choice of his life work and thus develop into an efficient and loyal citizen."

No. 5.

3 "It is a time (referring to the junior-high-school period with reference to the industrial arts) when every possible opportunity should be provided which might help the pupils to make a wise choice of their life work. It is the aim of this course to provide opportunities to gain information pertaining to various industries which will permit boys to test their vital interests and to ascertain latent ability.

No. 6.

12 "There are two alternatives; first, provide two kinds of manual arts for pupils in the grammar grades (junior-high-school period) or second, provide one—the vocational form and administer it so that it may be equally beneficial to all, but in different ways if necessary. The latter is more acceptable both from an economic point of view and an educational point of view as well."

No. 7.

5 "Skill is no longer considered the primary aim. More important even than the training given in tool manipulation and the actual construction of projects is the attitude created in the boy toward his work, his fellow workers and American industry. . . .

Present day courses of study must be based on vocational foundations with the American boy as the objective and education as the aim."

No. 8.

10 "Perhaps five per cent of the boys sampling woodworking, electrical work, printing and house repair will find among these their vocations. . . . Such contributions to vocation finding would in themselves constitute no justification for giving the practical arts subjects (industrial arts included). . . . The final justification . . . is to be found in the contributions such amateurish participation makes to general development, in ways analogous to the contributions made by physical play."

No. 9.

4 "Manual training . . . should be for the purpose of developing a general knowledge of and a sympathetic interest in industries. . . . There is a great volume of industrial knowledge with which all children should become familiar as a part of their general education. . . . This work, should be treated more as a science than as an art. Hence shopwork should form

but one part of the students' activities—observation, reading and class work being equally important."

No. 10.

"Industrial arts, as a school subject, is the distilled experience of man in his resolution of
7 natural materials to his needs, for creature comfort, to the end that he may more richly live his spiritual life."

No. 11.

"One purpose of the manual arts is to serve: As a means of developing certain attitudes of mind and habits of body and mind in some one
8 or more lines of industrial activity, not as ends in themselves in connection with the particular trade dealt with so much as attitudes and habits chiefly useful as a means of interpreting other related experience."

No. 12.

"The purpose of the work in these years may be stated as including values for increased practical efficiency and more intelligent citizenship; trying out of vocational guidance values; and values in concrete experience giving motive for and interest
1 in the subjects related to wider vocational and social interest. . . . To these may be added the specific training values for those who will enter industrial vocations. . . . Here, as in the elementary school, industrial intelligence, insight and appreciation constitute the largest values, and these should not be subordinated to the mere manipulation of tools."

A Children's Exposition

Charles A. Kunou, Supervisor of Manual Training, Los Angeles Cal.

IT is said California, especially Southern California, seems to unfold ideas of enterprise in a way that can be best understood in the terms that "Westward, ho! the course of empire takes its way." The very atmosphere on the southern pacific coast seems charged with the spirit of energy, progress, and enterprise, and especially is this so in regard to things educational. Now, education is the only true empire, that is, in so far as it serves the unfolding of the truth of all things. The writer has frequently heard statements from authoritative sources that nowhere is there manifested such a general public interest in educational questions as there is in California.

This, a short story of The Children's Exposition of Los Angeles, may, in a measure, testify to the correctness of that statement. Under the auspices of Parent-Teachers' Associations and the Assistance League of Southern California, this exposition, as gigantic as unique, was arranged and held during the weeks April 8th to 24th. To quote from the directors' initial statement: "The Children's Exposition is a new idea in the world of shows. As the program indicates, all groups of people interested in the public schools, the children and the future of Los Angeles, have been asked to take part.

But in the heart of every child is the proud desire to show the world what he or she has made in school, or out. Under the direction of the Federation of Parent-Teacher Associations and the Assistance League of Southern California, these exhibits of school crafts and home crafts, designs and fine cabinet work from the school shop, and live pets from the home, have been arranged by the young architects of the future to make a *Children's Market* of one week.

Purpose of the Enterprise.

"Here may the manufacturers of the community find their future craftsmen. Here may Los Angeles take account of stock in the training of skilled mechanics, as well as in the mastery of the 'Three R's.'

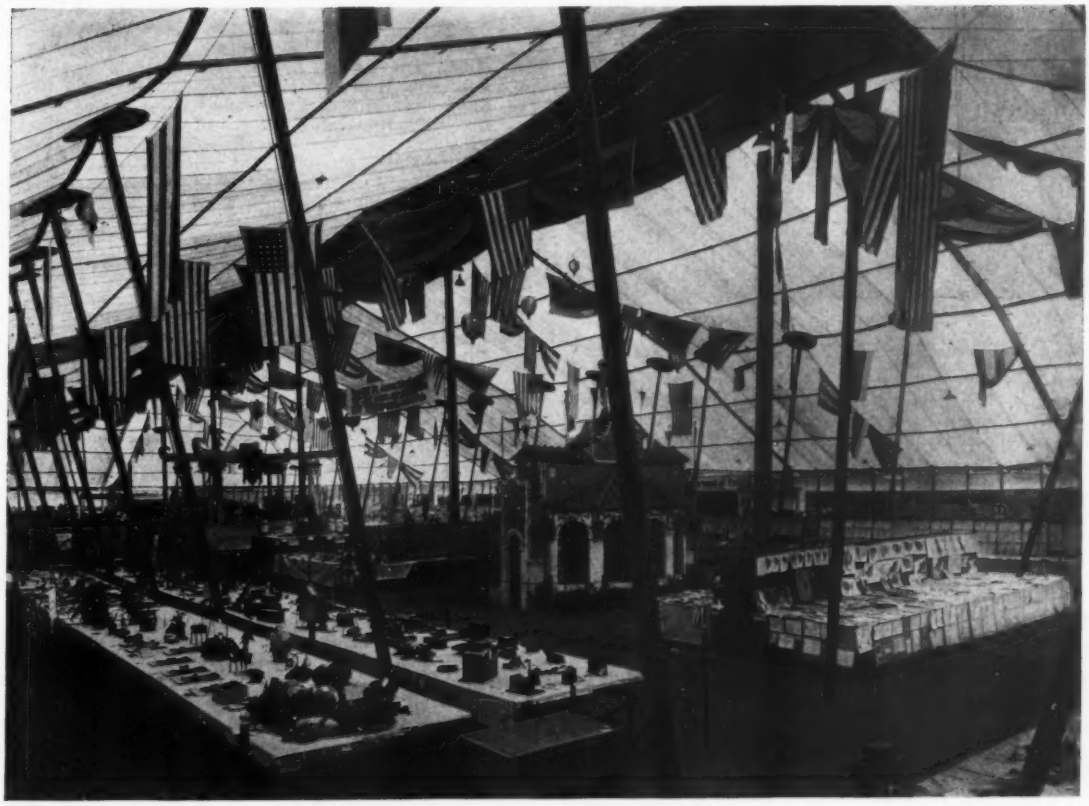
"This is the opportunity of the hour. Those who are helping may feel the deep pulse of usefulness beating beneath the mere giving of money and time for the milk fund and the children's charities.

"Every advertisement in this program, every gift, and every exhibit in the show points to a brighter day ahead."

It is held that the exposition was installed in "the biggest tent in the world;" and besides, there were two smaller tents. There were 65,000 square feet of space in these three tents at the city's Exposition Park, 27,300 square feet in the pet tent alone. The remainder were in the high school and elementary tents. About 125 ladies from the Parent-Teachers' association assisted in making the Children's Exposition a success, mounting and sorting the huge exhibit.

The purpose of the exposition was to place before the public, concrete evidence of the skill, perseverance, ingenuity, and development of the present growing generation in Los Angeles public schools, thereby creating an interest in and a desire for the passage of the $17,000,000 school bonds, soon to come to a vote by the public.

The proceeds from the various concessions and entrance fees are to be divided equally between the Los Angeles Parent-Teachers' Association and the Assistance League of Southern California, and be used for the milk fund and in assisting needy children.



GENERAL VIEW WITH TOYS OF INVENTIONAL MOTIVE.

View showing inventional things. The small roofless structure in the foreground is a replica of a manual training shop. It has benches, lathes, saw, grind-stone, etc., all run by a motor. Made by a sixth grade boy.

Plan and Scope of Exhibits.

"Open to all boys and girls from the first to the eighth grades inclusive, of the Public Schools.

"This exhibition will include *anything* made by a boy or girl, as well as their personal pets.

"Each child will be limited to one exhibit, but may also make one entry in the department of pets.

"Those children who desire to exhibit may secure official entry cards from any teacher or principal of the Los Angeles Public Schools, on Monday, March 6th, and thereafter until Friday, March 10th.

"Exhibitors will be required to fill out the entry cards and return them to teacher from whom procured by Friday, March the 10th. All entries must be recorded not later than that date. On Monday, March the 20th, an exhibitor's badge and exhibit identification tags will be issued to each exhibitor by the teachers to whom entry cards have been given. An exhibitor's badge will entitle the holder to admission to the exposition grounds for the purpose of installing an exhibit, at which time a season pass to the exposition will be issued to each exhibitor."

Prizes and Awards.

All entries were judged by competent committees of judges, who awarded first, second, and third prizes; also Honorable Mention ribbons in each division of each department. The different departments, and their divisions included:

Dept. No. 1. Toys—Toys of all kinds, of any material. Division A, Boats; Division B, Automobiles; Division C, Engines; Division D, Aeorplanes; Division E, Games; Division F, Miscellaneous.

Dept. No. 2. Arts and Crafts—Entries must show design and hand skill. Division A, Baskets; Division B, Books; Division C, Block printing; Division D, Stencilling; Division E, Leather Work; Division F, Weaving; Division G, Cardboard Construction; Division H, Clay Modeling; Division I, Miscellaneous.

Dept. No. 3. Domestic Art—Division A, Coats, Woolen, Silk, and Cotton Waists or Skirts, One-piece Dresses, Gowns and Aprons; Division B, Bags, Collars, Cushions, Scarfs, Slippers, and Caps; Division C, Hand-woven Mats and Rugs; Division D, 9 to 12-inch Dolls, dressed in Hand-made Garments; Division E, Patching and Darning; Division F, Miscellaneous.

Dept. No. 4. Woodwork—Division A, Furniture, Tables, Chairs; Division B, Boxes, Cabinets, Shelves; Division C, Woodturning, Bowls and Vases, Cup Frames; Division D, Patterns for Castings; Division E, Miscellaneous.

Dept. No. 5. Electrical and Mechanical—All kinds of Electrical and Mechanical Apparatus. Current can be supplied.

Dept. No. 6. Domestic Science—Division A, Bread, Cakes, and Cookies; Division B, Canned and Preserved Fruit and Vegetables; Division C, Menus; Division D, Miscellaneous.

Dept. No. 7. Agricultural and Horticultural—Division A, Fruit; Division B, Flowers; Division C, Vegetables, (Raised by the Exhibitor.)

Dept. No. 8. Millinery—Division A, Handmade Buckram or Wire Frames; Division B, Infants' and Children's Bonnets; Division C, Girls' hats—12 to 16 Years; Division D, Bows; Division E, Flowers; Division F, Miscellaneous.

MARINE MOTIVES.
End of section showing boats, sailing crafts, steamers, yachts, etc., also kites.

Dept. No. 9. Pets—All kinds of pets owned by the exhibitor. Division A, Dogs; Division B, Cats; Division C, Goats; Division D, Poultry; Division E, Rabbits; Division F, Birds; Division G, Fish; Division H, Miscellaneous. Exhibits were the property of the exhibitor. Paid attendants properly cared for the welfare of all animals. Exhibitors in this department provided cages and food for pets where possible.

All exhibits were received at the Exposition Grounds from 9 A. M. to 6 P. M., on Monday, April 3rd, Tuesday, April 4th, and Wednesday, April 5th, with the exception of exhibits in the department of domestic science and pets. Exhibits in these departments were received up until 10 A. M. Saturday, April 8th.

Each exhibit were labeled with an official identification tag. All exhibits excepting pets remained for the entire period of the exposition. Pets remained for the first four days and were then removed if exhibitor so desired. The exhibits were housed under the largest tents in the United States.

"It is hoped," it was announced, " that each and every pupil will help to make this exposition the largest and greatest event of its kind ever held. Remember, children, that 'a contract is a contract' and if you sign an official entry card you will be expected to exhibit your entry without fail. All exhibits are made at the owner's risk."

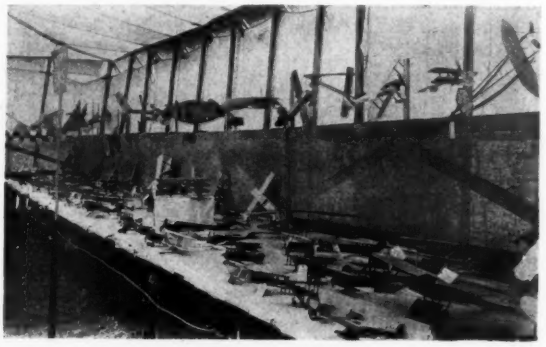
An Advising Body.

The official make-up of the children's exposition consisted of an executive committee, headed by Mr. Robert E. Wells, Director-General, and Mrs. Hancock Banning, Chairman. An advisory committee made up of the

Governor, State of California.
Mayor, City of Los Angeles.
President Board of Education, Los Angeles.
Superintendent of City Schools, Mrs. S. M. Dorsey.
President Assistance League of Southern California.
President Los Angeles Federation, Parent-Teacher Association.
Chairman, American Red Cross.
Vice-President California Congress of Mothers and Parent-Teacher Association.
President Los Angeles Clearing House Association.
President Chamber of Commerce.
President Merchants' and Manufacturers' Association.
President Motion Picture Producers' Association.
Board of Park Commissioners.
President Advertising Club.
President Rotary Club.

A committee of awards and a program committee made up of prominent women and men.

In the scheme of this exposition was incorporated a progressive program of daily special events, including such as minstrel shows, staged by world-famous stage and screen stars, and under the auspices of dramatic critics, oratorio chorus of one hundred voices, pageants by children, play presented by school principals, a boy scout day, interpretive and classic dancing of high order, a kite tournament, mammoth children's easter festival. There was a large midway, with many interesting shows and concessions, hot-dog, ice-cream and soda stands, merry-go-round; all operated on the scale and in the manner of a large fair.



AERIAL MOTIVES.
End of section showing aeroplanes, Zeppelins, etc.

The exposition was originally planned to be open only a week, but, on account of the increasing interest, it was held open an additional week. A large official program was published. It contained 65 pages of printed matter, and sold at fifteen cents a copy.

Entries and Exhibits.

Following is a specification of entries and exhibits arranged departmentally. It shows the great variety of things produced by children.

Department No. 1. TOYS.

Division—	
A—Boats	444
B—Automobiles	440
C—Engines	4
D—Aeroplanes	650
E—Games	64
F—Miscellaneous	1,272
	2,874

Exhibit of reed work, part of the display of blind children.

Department No. 2. ARTS AND CRAFTS.

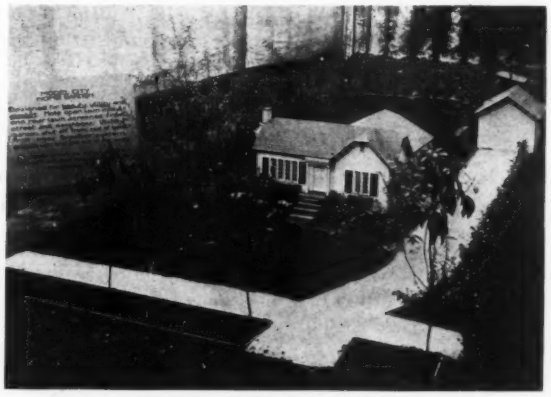
Division—	
A—Baskets	246
B—Books	144
C—Printing	68
D—Stenciling	34
E—Leather Work	22
F—Weaving	128
G—Cardboard Construction	402
H—Clay Modeling	194
I—Miscellaneous	1,604
	2,842

Department No. 3. DOMESTIC ART.

Division—	
A—Coats, etc.	940
B—Boxes	850
C—Mats & Rugs	556
D—Dolls	292
E—Patching & Darning	11
F—Miscellaneous	1,914
	4,563

Department No. 4. WOODWORK.

Division—	
A—Furniture	586
B—Boxes, Cabinets	554
C—Woodturning	114
D—Patterns for Casting	1
E—Miscellaneous	1,072
	2,327



AGRICULTURAL MOTIVES.

View showing part of school garden exhibit. It is a model home and part of the scheme of a model city.

Department No. 7 AGRICULTURAL.

Division—	
A—Fruit	30
B—Flowers	155
C—Vegetables	90
	275

Department No. 8. MILLINERY.

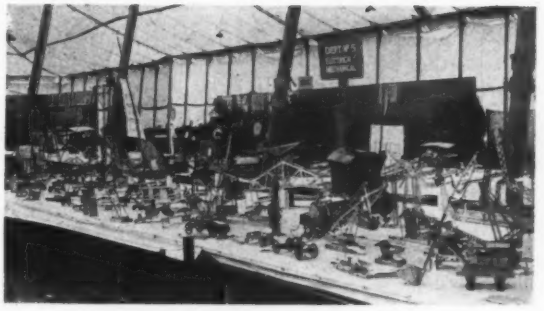
Division—	
A—Wire Frames	4
B—Bonnets	4
C—Girls' Hats	34
D—Bows	2
E—Flowers	84
	128

Department No. 9.

PETS	6,500
High School Exhibits	2,450
Junior High Exhibits	1,500
GRAND TOTAL ENTRIES	24,667

Department No. 5. ELECTRICAL AND MECHANICAL.

Division—	
A—Electrical and Mechanical	210



MECHANICAL MOTIVES.

Sectional view of electrical and mechanical exhibit. In the center is a steam shovel, operated by a motor. Made by a sixth grade boy.

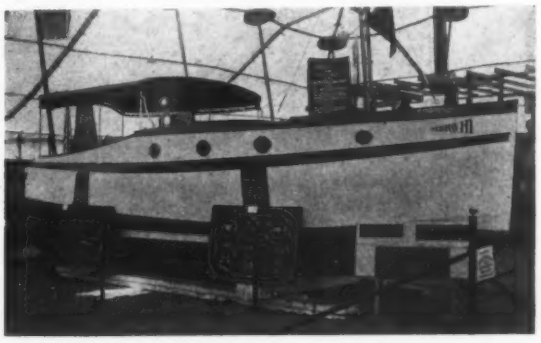
Department No. 6. DOMESTIC SCIENCE.

Division—	
A—Bread, Cakes, Cookies	680
B—Canned Goods	88
C—Menus	4
D—Miscellaneous	226
	998

Educational Value of Enterprise.

In order to convey an idea of the magnitude and significance of this most advanced and modern educational enterprise, following list of awards which were bestowed on children exhibitors is presented. There were awarded: 45 gold medals; 45 silver medals; 45 bronze medals; 100 blue ribbons, equal to 1st prize; 100 red ribbons, equal to 2nd prize; 100 yellow ribbons, equal to 3rd prize; 400 white ribbons, equal to honorable mention; 26 ribbons at kite tournament; 1 bronze medal at kite tournament; total number of awards, 822.

The educational value of this exposition to the community, the public and the schools can not be overestimated. It showed up the general status of the pupils and what they could do in school and out of school. It uncovered several defects which wisdom bids not to mention here, and which could not have been discovered in the usual "select exhibitions". It presented to the citizenry in a tangible and effective way, the variety, practicableness and magnitude of the activities of the schools. The great variety of color on toys, furniture, and textile objects, produced an effect both



MARINE MOTIF.

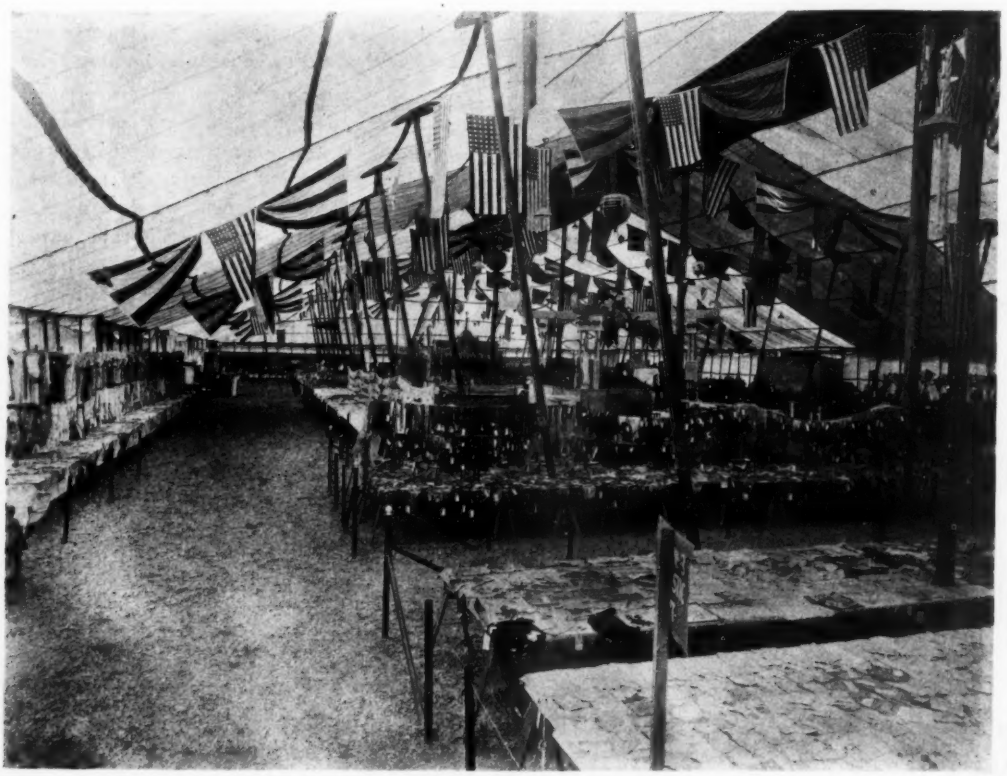
Gasoline launch. High school work. Marine department. The launch is of Flush deck line, cabin cruiser type. Length 28 ft. Beam 8' 6¼". Displacement 3½ tons. Speed 14 knots. Motor 14 h. p.

TOY MOTIVES.

End of section showing the great variety of toys.

romantic and pleasing, because of the rather unconventional way in which the things were mounted, hung up and otherwise arranged.

The writer has been instrumental in arranging and has seen numerous exhibitions, but this was the most colossal "put over" anywhere so far as he knows. Exhibitions of this kind are potential in rousing the citizenry of a community to realization of the needs of the schools, and to awaken general public sentiment and interest in education, and be the means of accomplishing much good.



TEXTILE MOTIVES.

Section showing Domestic Art. The band stand is seen in center.

The General Shop

Clarence E. Howell, Supervisor of Industrial Arts, Lincoln, Nebr.

WITHIN the last year or two there has been considerable agitation among educators in favor of that organization of shopwork variously known as the general shop, the tinker shop, or the all-purpose shop. The central idea is to combine within the four walls of one shop, experiences and instruction in various mediums and industrial processes. Thus we might consider a general shop in which there would be a unit of equipment for wood working, a unit for plumbing, one for automobile repair, and one for electrical work, all in the same room. Presuming a class of 20 boys we would then divide them into four groups of five boys each One group would work in the wood working unit, another in the plumbing unit, a third in the automobile repair, and the fourth in the electrical. At stated intervals during the semester the groups would shift so that each might gain experience in all of the units.

This may not be the exact method used in all of the so-called tinker shops or general shops, but it may be taken as representative of the idea.

There are obvious advantages to such a scheme of operation. Perhaps it will facilitate an understanding to list some of these, and some of the disadvantages, so that we may compare them.

For:

1. It provides varied experiences for the pupils
2. It requires less room.
3. It requires less equipment.
4. It secures and holds better interest on the part of the pupil.
5. It enables the pupil to accomplish more in less time.
6. It makes sure that the pupil obtains a more varied experience while he is still in school instead of putting some of it off until after he may have left.

Against:

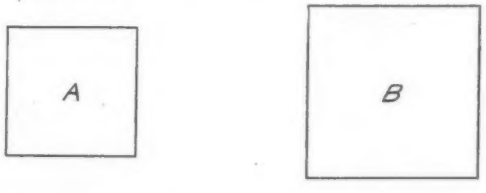
1. Difficulty of securing and maintaining qualified teachers who are specialists in their lines.
2. Impracticability of trying to instruct or demonstrate to one group while the other units are hammering, sawing, and doing other kinds of noisy work.
3. Difficulty of handling four distinct type-groups of work in the same room, at the same time, by one teacher.
4. Multiplicity of tools, equipment, and supplies to be checked and kept up.
5. Increased number of preparations for the teacher.
6. "Junk shop" atmosphere rather than that of any one industry.

Let us analyze these arguments.

For 1: Varied experiences for pupils. It seems self-evident that the general shop would provide varied experiences for the pupils participating in it. It would probably also be true that such a shop, if it is to be the sole shop experience of the boy, would be preferable to one devoted exclusively to one subject, provided, of course, that the chief aim at that period in his education is explorative rather than vocational.

For 2: Requires less room. There may be some question as to this assertion. If it means that one shop equipped to teach four different subjects would require less room than a separate shop for each of the four subjects, then its correctness is too obvious to require discussion. If, however, it means that a school which now has four separate shops and keeps them all busy could economize in space by doing away with these and substituting four general shops, then the problem is quite a different one. There seems to have been a good deal of loose thinking on this proposition, and frequently statements have been made which might infer either of the above conditions. It may be well, therefore, to follow up the last possibility and see just what the space needs for the general shop would be.

Consider first the equipment for an automobile repair shop. In this shop, supposing it to be devoted exclusively to the subject, there would be two classes of equipment, one which might be called individual, and the other general. Let us arbitrarily assume that the individual consists of a screw driver, a Crescent wrench, and a hammer. Represent graphically this individual equipment for one boy by the square "A".

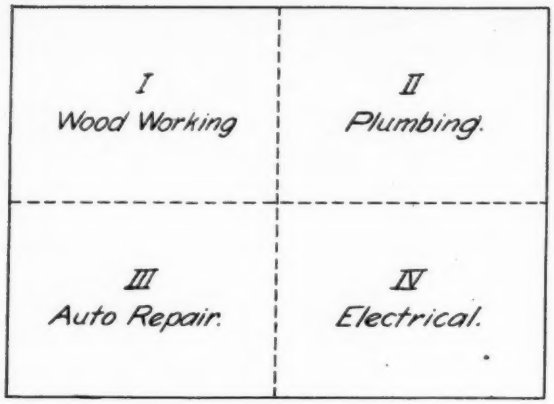


Individual Equipment. *General Equipment*

It is evident that there are a great many tools which will be necessary in the repair of an automobile which will not have to be provided for each pupil, but which may be in the nature of general equipment to be used by all boys in common as needed. For example we may name assorted S wrenches, socket wrenches, cotter pin extractors, cold chisels, punches, and jacks. Represent these graphically by the square "B".

Returning to the layout of our general shop, and supposing that it provides for a total of 20 boys per period in four units, five boys to each unit subject. The floor space might be assigned after the following plan:

For each shop subject there will be the same general division of equipment into individual and general as



FLOOR PLAN

was illustrated for the automobile repair shop. Therefore in unit I there will be five times square "A" of individual equipment, since five boys will work there, plus 1 square "B" of general equipment.The same will be true of units II, III, and IV. Therefore the whole shop will use 20 times square "A" of individual equipment plus four times square "B" of general equipment.

But if the entire shop were used for automobile repair instruction it would use 20 times square "A" individual equipment plus only 1 times square "B" general equipment. Therefore under the general shop arrangement there would be required enough more space per room over the single-subject shop plan to accommodate the three additional general equipments for the three additional subjects.

Objection may be made that a class of 20 in a subject would require more general equipment than one of only five. This may be technically correct, but the increase would be of such minor proportions as to be negligible for our present purposes.

For 3: Requires less equipment. This may be refuted by the same illustrations as those just used with reference to the total space needed. The amount of general equipment necessary will be increased by one for each subject added, thus requiring more equipment rather than less. This statement is based, of course, upon the assumption that under either plan the same total amount of time would be devoted to each subject.

For 4: Secures and holds better interest upon the part of the pupil. The plea that a variety of work and materials will create a greater interest has some validity, but within limits only. One must presume good teaching in the varied-subjects courses and poor in the single-subject ones if this is to hold. Multiplicity of processes and materials might easily lead to confusion. Failure to complete projects, or an inability to do a good job within the necessarily short time allotted might create dissatisfaction and an actual loss of interest. On the other hand, there is abundant material within any one shop subject to arouse keen interest, if it is properly presented.

For 5: Enables the pupils to accomplish more in less time. It is difficult to understand just what is meant by the phrase "accomplish more in less time." Possibly it refers to touching upon four subjects within a semester, where the one-subject shop usually limits the pupil to 1 each quarter, or 1 each semester. It is a fact that from a certain point of view a pupil could cover more ground in a semester by spending one-fourth of it in physics, one-fourth in chemistry, one-fourth in biology, and one-fourth in zoology than he would if he spent the entire semester in physics, let us say, but it must be seriously doubted if he would really accomplish more in less time.

For 6: Makes sure that the pupil obtains a more varied experience while he is still in school, instead of putting some of it off until after he may have left. This seems a legitimate reason. There is no question of the desirability of giving the pupil as many experiences as possible within the time he is in school. However, we must be careful that these are true and typical experiences, not merely high-lights of the most attractive or easiest phases. There also remains the issue as to which is better for the boy whose school life is limited, a series of flash-lights of varied interests, or a comparatively intensive education in a more limited field.

Against 1: Difficulty of securing and maintaining qualified teachers who are specialists in their line. The difficulty of obtaining teachers who are really qualified in four unit subjects at once is undoubtedly a great one. Few cabinet makers are plumbers, and fewer still are also mechanics and electricians. It might be possible, however, to train teachers for this particular field. There would be two principal difficulties to meet. First, if the teachers are to give the pupils real insight into the several industries concerned they should have had actual experience in them. They should have the background and psychology of the subject which can be obtained only through rubbing shoulders with fellow workmen in the trade. Second, the teacher should, by working at his trade during vacations, keep in step with the progress of thought and practice in that trade. These attainments are fairly simple where one industry is involved, but to endeavor to keep up in four at the same time might offer a number of difficulties. This is an age of specialization and usually it is about all a man can do to keep well posted in one line. By increasing the number of specialties in which we expect a teacher to be qualified and to keep up, we are increasing the difficulty of employing him. Even now it is hard to secure competent men teachers under the one-subject shop plan.

Against 2: The impracticability of trying to instruct or demonstrate to one group while the other units are hammering, sawing, and doing other kinds of noisy work. This is a very important point, but one which it seems especially difficult for academic teachers and administrators to appreciate. Shopwork, particularly when done with any degree of intelligent understand-

ing on the part of the students, must always be accompanied by frequent demonstrations and bits of theoretical instruction. To be most effectual this instruction should be informal; that is, it should be given when the situation demanding it arises rather than at some formal time-period. Such a demonstration demands hearing as well as seeing. The instructor must explain and the pupils ask questions. To do this under the general shop arrangement would mean one of two things, either attempting it with one group while the other three are hammering, sawing, running machinery and otherwise making loud noises, or requiring the other three groups to remain quiet, which would mean in idleness, while the demonstration was going on. Both of these plans are impractical. The first situation is impossible on account of the noise, and the second would result in a large portion of the time being spent in idleness by three of the groups while some one of the four were receiving demonstration or instruction.

It would be possible to have a small lecture or demonstration room attached to the shop, but this is open to two obpections, first, it takes the teacher away from the classroom where the other groups are working, and second, it is frequently necessary to give the demonstration where the equipment and materials are located, rather than in another room.

Against 3: Difficulty of handling four distinct type-groups of work in the same room at the same time by one teacher. The problem of obtaining one teacher who is alike prepared by experience and training to teach four separate and distinct specialties has already been touched upon. In addition we must consider the probable disinclination of teachers to try to handle such a situation. The teacher's attention during class periods would have to be divided between four distinct groups of pupils, each working in markedly different trades and with distinctive machines and materials. No group instructions or directions as a whole would be possible, and the difficulties surrounding demonstrations or instructions to any one of the four units while the other three were working have already been outlined. Under such conditions the successful handling of the class as a whole would likely be possible only through a reversion to some type of laboratory experiment scheme whereby experiments would be assigned by leaflet, instruction card, or book. Thus initiative and informality would at once give way to a cut-and-dried textbook type of formal instruction. Such experiments would necessarily have to be confined to equipment and materials ready prepared for manipulation. They could not successfully teach the proper handling of a plane, or the soldering of a joint. The human element would be lacking.

Against 4: Multiplicity of tools, equipment, and supplies to be checked and kept up. To the shop teacher the care, maintenance and checking of shop equipment and materials is a difficult problem. Dealing with material things means an actual handling of them as they come in, and as they are given out to the pupils. Materials used must be estimated and ordered far enough ahead to be on hand when needed. They must be checked when delivered. They must be put in condition for issuing to the students. The kinds and amounts issued to each student must be recorded and, frequently, charged for at cost prices. Cash accounts must then be checked, balanced, and turned over to the school board. Tools must be inventoried. A careful check must be maintained on them at all times to see that they are not lost or stolen. They must be kept sharp, and replacements made promptly for those that are broken. Machines must be kept oiled, belts tightened, blades and saws sharpened and adjusted. All of these are matters which demand the actual attendance of the teacher at the shop, they cannot be taken home and looked after in the evenings or Saturdays as can the grading of history or mathematics papers. It would be considerably simpler to index, inventory, maintain and check tools, equipment and materials for one line of industry than for four. There would be just one-fourth the variety, for one thing, to say nothing of the actual increase in numbers created by four general tool equipments instead of one.

Against 5: Increased number of preparations for the teacher. The teacher who attempts to be a specialist in four unrelated subjects cannot escape the fact that his preparations are practically multiplied by four over what they would be under the one-subject shop plan. Neither can the administrator who inaugurates the general shop scheme avoid responsibility for the resultant poorer quality of teaching and less effective preparation bound to result from such a division of the teacher's interests and activities.

Against 6: "Junk shop" atmosphere rather than that of any one industry. It is to be presumed that one of the primary purposes in the general shop idea is a discoverative, informational, or pre-vocational nature, with the object of giving the pupil some insight into the industry concerned. If this insight is to be truly indicative of the particular industry, he must not only learn something of actual processes and methods, but he must feel the atmosphere and the psychological situations incident to that industry. To create this atmosphere and to approximate real industrial conditions is one of the most difficult problems our schools face today. It would seem possible that the general shop idea might easily create a less favorable situation for this purpose than the single-subject shop. There would be a division of interests, materials, and manipulations within the four walls of one room which might tend towards a junk-shop impression rather than a clear vision of any one industry.

Considering the arguments given for and against the general shop, I wonder if it would not be fair to conclude that:

For junior high school grades where the object is discoverative, informational, or pre-vocational, variety is an essential element in the shopwork, consequently—

(1) Where the school enrollment is so small as to make possible only one shop this shop should be of the general shop character.

(2) Where the enrollment makes more than one shop necessary the shops should be of the one-subject type so far as possible.

(3) Wherever funds or enrollment permit it the separate shop for each subject is to be greatly preferred over the general shop.

From a mere enrollment point of view, if we presume a junior high school in which there are 100 boys to take shopwork every day in the week, 20 boys to a class and five periods in the day, then one general shop would handle them nicely. But if there should be 400 boys instead of 100 then it would seem far better, for the reasons already set forth, to have four special one-subject shops and rotate the boys among them than to repeat the general shop plant four times.

Under actual practice, of course, one would need not only to consider the discoverative, informational, or pre-vocational purpose of the junior high shops, but also the needs of the ninth grade, in which it would probably be desirable to give the beginnings of industrial specialization to such students as might so elect.

Reproducing Antique Furniture in the School

Herman Hjorth, Director of Technical Work, San Juan, Porto Rico

TABLES—Conclusion.

The opening mechanism of the Gate-Leg table, illustrated in Fig. 13, is the one most commonly used and differs from those described in the two preceding tables. In this case the gates swing on two pivots each and when closed are made to come flush with the fixed legs by means of a cross-lap joint in the swinging leg and the turned rails. A recess is cut in the swinging leg at its upper extremity, so that it will fit over the apron and be flush with the fixed legs when closed. The pivots consist of ½″ dowels glued into the turning part of the leg and moving freely in the fixed parts. When the two legs having the pivots are turned, allowance should be made for cutting and fitting them at the points of the pivots. The square parts of these legs should therefore be made about 3/16″ longer. Sufficient thickness should also be allowed for squaring them after they have been turned and the pivots made. This table is provided with two drawers, one at each end. It will be noticed that the curved end is the front of the drawer and that the drawer itself slides

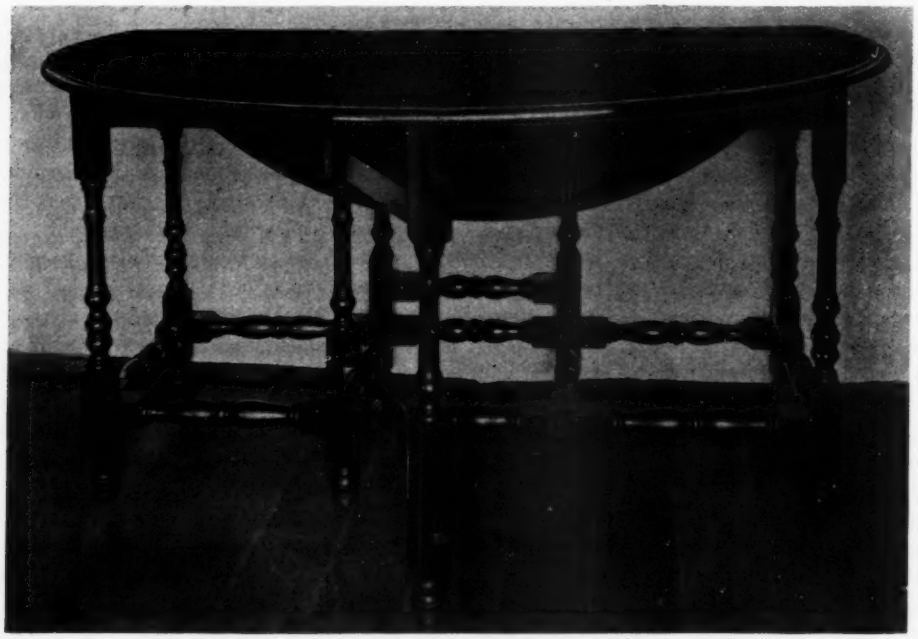


FIG. 13.

Courtesy of Mrs. C. W. Siegmund, San Juan, P. R.

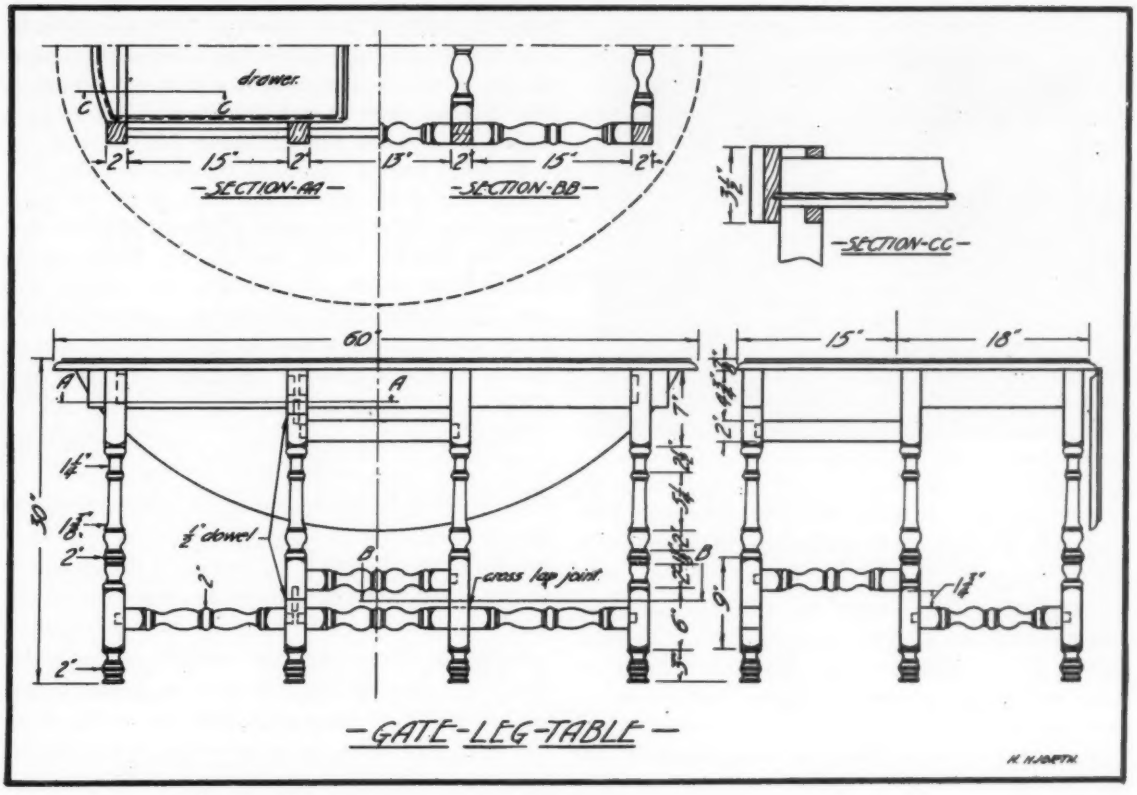


FIG. 13.

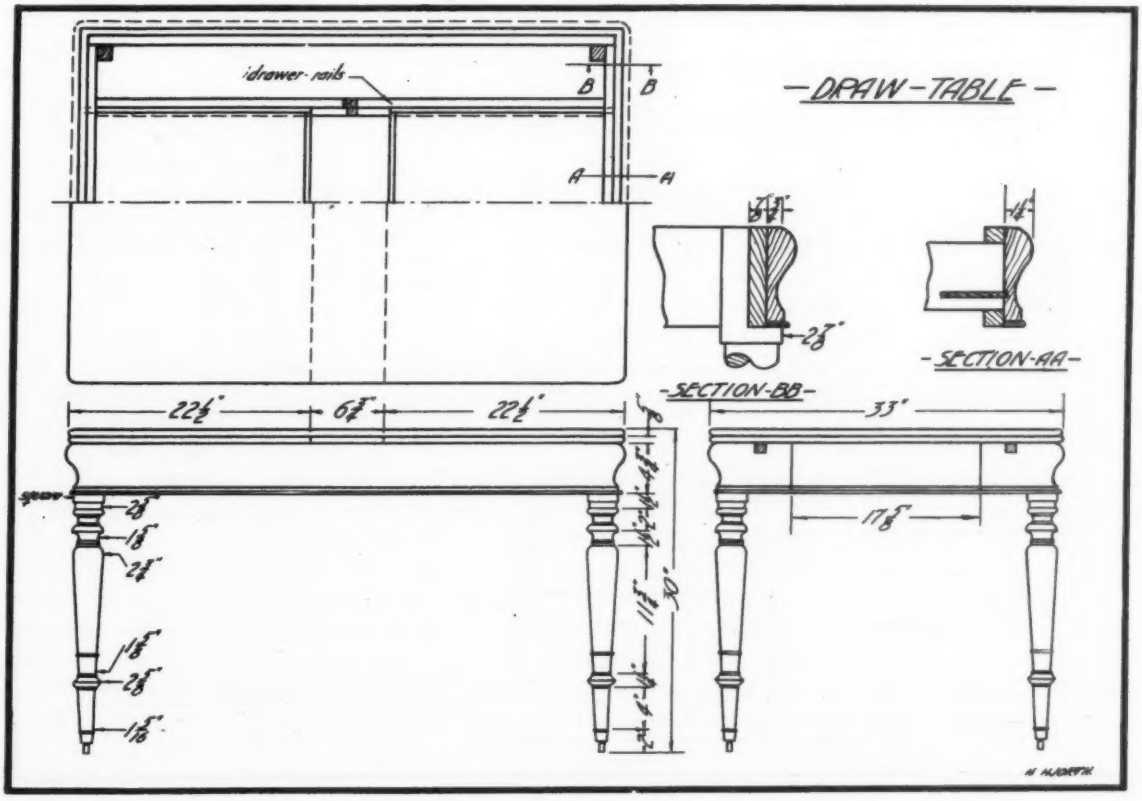


FIG. 14A.

FIG. 14.

between two rails mortised into the end legs. This table was designed by the writer and is Jacobean in character.

Fig. 14 is a "draw-table" or "drawing-table" as it was originally called. This style of table was invented during the Jacobian period (1603-1688) and is by many expert cabinetmakers considered the best extension table ever produced. It is not as common as the type of extension table with loose leaves, but it is still made in our day by the best furniture factories. The mechanism may at first appear difficult and intricate, but is in reality quite simple and fairly easy to make once the principle of construction is thoroughly understood. It will be seen from the drawing as well as from the photograph that the table has one top covering its entire width and length. Below this top, a narrow piece, 6-¾" long is screwed to the rails or apron (see No. 1, Fig. 14B), and on each side of it is a piece, 22-½" long. The last named pieces are the ones that pull out, thereby almost doubling the length of the table. These pieces are screwed to two sliding rails each (No. 4, Fig. 14B), which slide in slots cut in the apron and in blocks screwed to the underside of piece No. 1. From the detail of the sliding rail its dimensions will be noted, and also that the lower edge on which it slides is a straight line. The slot cut in the apron is ⅞" deep, so that when the leaf is pushed in (closed) its underside rests directly on the apron. As the slot is ⅞" deep and the rail 1-½" thick, it follows therefore that the leaf is ⅝" higher in the open than in the closed position, and as the upper top is ⅝" thick, the leaves and the top will consequently lie in one straight line in the open position. When either of the leaves is pulled out, the upper top gradually rises with it until it drops in place when the leaf is all the way out. The top is therefore secured with two loose bolts passing through piece No. 1 to prevent it from sliding off, and also to keep it in its position. As this

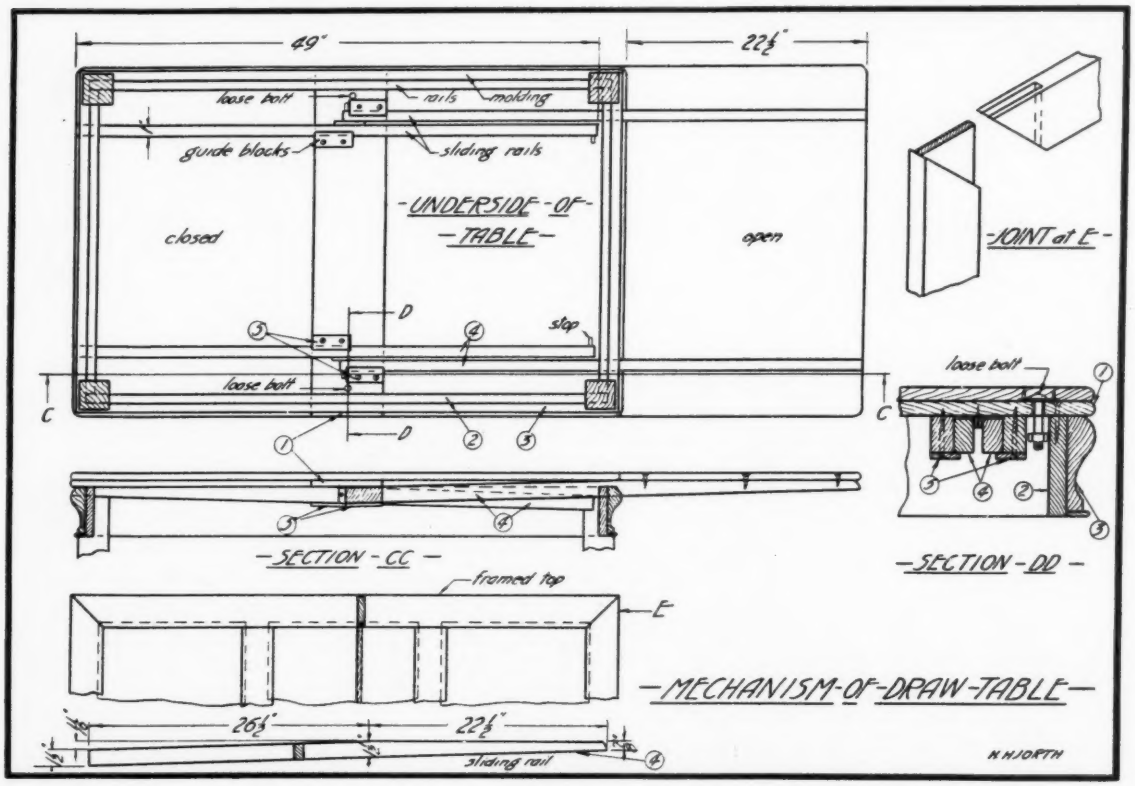


FIG. 14B.

top is loose it must be made of either three-ply wood or framed, as shown in the drawing, to prevent it from warping. The table may be used closed, with one leaf open as shown in the drawing, Fig. 14B, or with both leaves open. It is provided with a drawer at each end, shown in the drawing, Fig. 14A. These drawers run on guides mortised into the rails of the table at both ends. The sliding rails of the leaves run outside of these guides. The drawer guides and sliding rails are shown on separate plans for the sake of clearness.

The Mechanical Drawing Instructor and the Industries

A. B. McCall, Instructor in Mechanical Drawing, Springfield High School, Springfield, Ill.

THE mechanical drawing instructor has an excellent chance to make his mark in the field of education and industry. His work can and should be a happy coordination of both. His duties are educational and his work lies in a field that is truly the first step beyond the mental stage of mechanical and industrial progress.

He is a connecting link in the chain of industry. He is the link between the amateur and professional draftsman.

Most of the visible evidences of advancement in industry originate in the architect or engineer who was once a mechanical drawing student.

The mechanical drawing instructor is in a position to be one of the big men if he has the stuff in him that makes the men who do things. Opportunities to make good are constantly coming into his environment. He can see them and grasp them if he is the man who knows how to recognize them and how to value them.

Mechanical drawing teaching is a part of industry. The instructor must know the ways of industry. He must be a practical man and know the technique of his work so well that it is second nature to him. He must know the technique of art from the viewpoint of its practical application.

The instructor in this subject who would be a live wire in his business will make it a point to keep in touch with principles and methods of industry. If he is a wide-awake man, he will doubtless have the friendship and support of many of the leaders of at least local industries. If he is a man worth his school salary in the industries, he can be worth more to society as an instructor, although he may not be able to get it.

The industries are always on the lookout for men who are trained and experienced in directing activities of groups of workmen. Industry also needs men who know how to take the attitude that successful workmen should take, as well as the attitude that it takes to make a successful mechanical drawing instructor.

The subject of mechanical drawing is one in which the efficiency of the instructor may be concrete and visibly evident in the work of the student. This is not always the case but is usually so.

The mechanical drawing instructor who would push to the front in his work will be a man of ideas. He will be able to look ahead of his daily work into the future, as he grasps the vision of his wonderful opportunity for service in connection with his responsibility in the classroom. In the meantime, he will be mindful of the technical training of his students.

He will bear in mind at all times, in the classroom, that the beginning student is awkward with the drawing instruments and must be trained to use them correctly in the technical sense before good work can be accomplished.

He will remember that some of the best engineers do what drafting they do only with a pencil, and that the best draftsman is not always the best engineer, nor is the best engineer always the best draftsman; but that it takes brains and practice, with good, technical guidance, to be either successfully.

The student of mechanical drawing who makes good will learn to make neat letters, figures and arrowheads. He will learn the various technical ways of blending arcs and curves; he will understand how to apply his knowledge of descriptive geometry to the representations of machines, etc. He will learn to get from one-view dimensions which are necessary for the drawing of another view, and that to be able to draw a machine to scale is useful only to those who would know something about the machine's construction; and he must be able to do something more than merely copy to scale.

The instructor of mechanical drawing has a chance to be a man with a big idea, who can make it count for something. He knows that there are certain fundamental principles, which, when once thoroughly mastered, can be utilized in most any line of business; and he studies to grasp those principles from the lives and actions of leaders in education and industry. He gives his students the advantage of his observations and ideas, and helps them to try to find themselves.

When he attempts to study the habits and characteristics of men who are doing things in the world of busy people, he can usually find something particularly evident, that is, a determining factor in making the difference between the big man, the man of big ideas in his line of work, and the man of ordinary efficiency.

A man, young or old, without a compelling, convincing, consuming, big idea is destined to failure in his line of service.

The observing man, who is also a thinker, can get a world of ideas from his daily observations and experiences and these will be a wonderful help to him, if he records and uses them when the occasion demands.

It is a fact that events are only the shells of ideas, and the thinking observer is constantly finding ideas everywhere, in newspapers, books, sermons, music, art and his experiences.

The progressive man who is making his mark in his work, is the man who discovers ideas and knows how to put them to work.

An idea is a throttle of action or a dreamer's dream, according to who has it.

This is a time when men of big ideas are worth more to the world of industry and education than they ever were before. The world is showing an increasing need of men who have originality, personality, brains and initiative, with a big idea to throttle their efforts.

The big men still get big pay and will always get it. The little fellow still gets small pay, and the men who render service to society will always get a remuneration commensurate with the value of services rendered. This will be especially true when conditions will permit human values to reach their respective levels. The past few years have seen conditions in our country that have put an abnormal rating upon the value of human services as rendered in industry. The world of industry and education pays little return for little service.

When we try to size up the men who are leaders in the world about us, we always notice that they are men who once looked into the future and discovered that success is not a secret but an open reward for preparation and a high quality of salesmanship.

It is an interesting fact that when a $10,000 man is wanted by a big employer, this man is usually found already employed.

The stories of experiences of great men in the field of education and industry, who have started with little or no help, are so numerous and so fascinating that some of the big fellows who started with wealth at their disposal, rather hate to admit it these days.

There has been a tendency in the past to make exhibitions of mechanical drawing work of a spectacular nature, but this is a subject that should give the major attention to technique and the fundamental elements of engineering, and then let the public judge the merits of work exhibited, from that standpoint.

The mechanical drawing instructor is just beginning to mold and direct the habits of the future engineers. He sees in certain students the future men who can, and will. He teaches students how to develop the habit of visualizing; a habit that is absolutely essential to the successful designer in the field of engineering. The instructor in this subject is in a position to discover the brains of the future industries, as he studies the aptitudes and bents of his students.

He will be quick to see in a student, the elements of success in industry, business or professional life; but he will be wise and not be too hasty about trying to guide the student into certain special lines of work before he has carefully studied and analyzed the influences that seem to be holding the student's interest for the future. The limitations of some students, either physical or mental, would make them fall short of success in some lines of work that they might think they are interested in, and the wise instructor will be aware of that fact in offering advice to students.

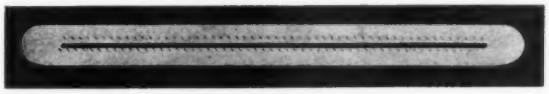
The mechanical drawing instructor has the students before and not after they have made good in the world of industry, and if he is the big man, with the big heart, with a big idea, he will turn out students who will have a wholesome view of industry, when they go into it. He will teach them to recognize the little points of merit that distinguish the men who lead from the men who follow; and these students will all be better and more worthy men because of having once been students under the direction of a man who could successfully guide the talents of men from the mental field of visualization into the broad and busy field of industry.

Rake Knitting

Bertha Thompson

"WHAT is rake knitting?" I am so often asked this question by people who have not seen the work done by our sick and convalescent soldiers in the Army and Public Health Service hospitals. When the layman hears of "rake knitting," he immediately thinks, of course, of a common or garden rake, and is puzzled to see how anyone could knit on such a tool. It is true that some years ago Miss Suzan E. Tracy of Boston introduced "knitting" for invalids on a rake very much like a wooden garden rake without its handle. Her rakes were made in many different lengths, and the size and spacing of the wooden pegs varied with the material to be used in knitting. Her pamphlet, "Rake Knitting," published by Whitcomb and Barrows, shows how much she was able to accomplish with a rake of this type.

Round rakes with wooden pegs are still often preferred for the making of caps, but the straight rake which has been so popular with the patients in the Army and Public Health Service hospitals, is made with a double row of finishing nails or wire brads as shown in the photograph.



RAKE.

This rake is best made of yellow poplar or red gum. Select well-seasoned lumber, free from knots, about ¾ to ⅞ inch thick. Make the rake 32″ long and 2⅝″ wide. The open space down the center is 27″ long and ⅜″ wide. Cut this out with a key saw, or better still with a jig saw or a band saw if either of these is available.

The wood must be carefully planed and sandpapered to remove any roughness which might catch the yarn.

The spacing of the nails varies in different rakes, but on one most commonly used they are set ⅜″ apart in the row and rows are ¾″ apart. Use 1″ finishing nails or wire brads 1 x 16. The nails must be set carefully as indicated in the diagram (No. 1), and project evenly ⅜″ above the surface of the wood.

An ordinary nutpick makes a very good "pick" for lifting off the yarn, or a pick can be made from a 3″ finishing nail, set in a wooden handle, and bent and filed into shape, and finished with emery cloth, oil and pumice.

Shawls, scarfs, sweaters of various kinds, and many other simple straight line garments can be made on this rake. A scarf or shawl is the simplest thing to make. An average length shawl will require about 16 to 18 oz. of four-fold yarn.

Having secured the yarn, the first thing is to learn how to start the knitting.

Drive a thumb tack or a brass headed carpet tack into the side of the rake near each end until the head is just a little above the surface of the wood. This is to hold the yarn after winding the rake, while the stitches are lifted off the nails.

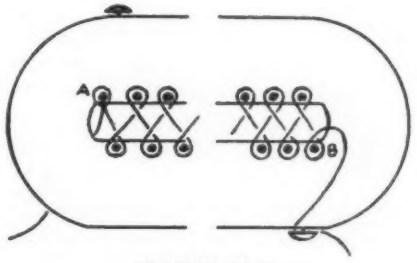


DIAGRAM NO. 2.

The stitch most commonly used for shawls is known as the plain or single stitch.

Tie the yarn to nail A, leaving an end three or four inches long which is slipped through the opening in the rake. Let the rake rest in the left hand. With the right hand wind the yarn around the nails as shown in the diagram. Do not pull the yarn too tightly, just hold it easily between thumb and finger. When the last nail B is reached, wrap the yarn once around the tack to hold it.

Draw the smooth flat side of the pick rapidly down the length of the rake between the rows of nails. This pushes the yarn to the bottom of the nails, and leaves space above for the next winding of yarn.

The yarn must now be wound back across the rake.

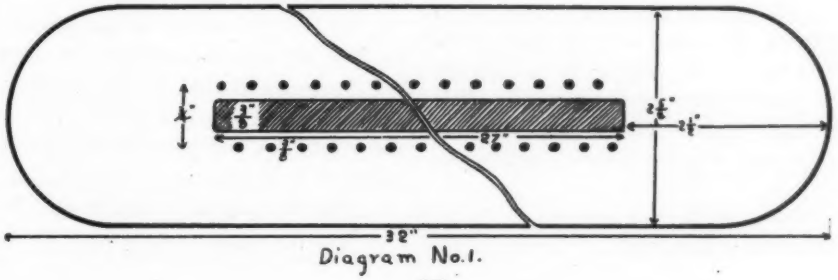


Diagram No. 1.

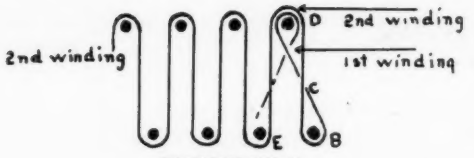


DIAGRAM NO. 3.

The first winding ended at B with the last cross at C.

Wind the yarn around D and E without crossing it and so on back to the end of the rake where the first winding began. Be sure in this second winding that the yarn is kept above the first winding.

The yarn has passed twice in front of each nail with the exception of nail B.

With the pick lift the lower thread (1st winding) over the upper thread (second winding) and off the nail. Do not stretch the yarn more than just enough to lift it over the head of the nail. Do this along one side, then along the other, leaving out the nail B which has just one thread. This completes the first row of stitches.

Wind again once across the rake, and lift the lower thread at each nail over the upper thread and off to complete the row of stitches. Continue in this way until the shawl is long enough.

To cast the knitting from the rake, use a steel crochet hook No. 1. Having left a length of yarn 3 or 4 feet long, with the crochet hook lift the yarn off the last nail, then off the last nail in the opposite row. Draw a loop of the yarn left hanging, through both these stitches, leaving this loop on the crochet hook. Take the yarn off the next nail and draw another loop of the yarn through the stitches on the hook.

Continue until all the stitches have been crocheted from the rake.

This row of crocheted stitches will be tighter than the first row of knitting at the other end of the shawl. To take up the loose stitches at the beginning crochet once across using a single crochet stitch.

Finish the shawl with a simple knotted fringe. Double two or three strands of yarn and knot into the shawl at the bottom of each rib.

A Child's Sweater Jacket.

A child's sweater jacket can be knitted quite easily on this rake. The photograph shows one made of four fold white yarn. It required 12 ounces.

Diagrams 4, 5, and 6 were followed in knitting this sweater. The back and fronts of the sweater are knitted in one piece, with the single or plain stitch used in the shawl described above. The band at the bottom of the sweater and up the fronts, the collar, cuffs, and the top of the pockets, are knitted with the double stitch. This differs from the single stitch in that the yarn is crossed between the nails at *every* winding as shown in Diagram No. 2 above.

Use about 80 nails, 40 in each row.

Knit 2½ inches of double stitch.

Child's Sweater Jacket made by a patient at Kenilworth Hospital. (See Diagrams 4, 5, 6.)

Knit 10½ inches of single stitch.

Cast stitches off four nails at both ends of the knitting. To do this lift the thread from the first nail on to the nail opposite, making two threads on this nail. Lift the lower thread over the upper thread and off the nail. Lift the thread from this nail onto the next opposite, making two threads on this nail. Lift the lower over the upper and off. Continue this until four nails have been cleared, then do the same at the other end of the knitting.

Knit straight for 1¼ inches.

Cast stitches off two nails at each end of the knitting.

Knit straight for 1¼ inches.

Cast stitches off two more nails at each end.

Knit two inches.

Cast stitches from sixteen nails (eight in each row) directly in the center of the knitting to make the back of the neck.

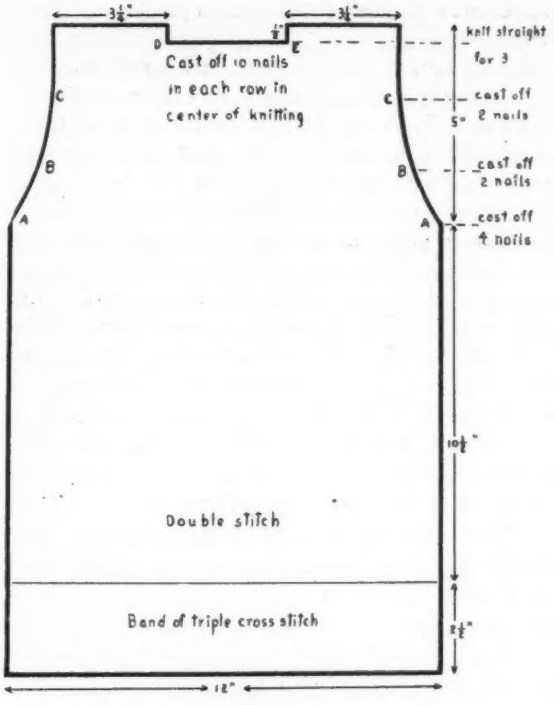
The knitting is now in two parts, and two balls of yarn must be used.

To knit the fronts of the sweater (see Diagram 5), knit the shoulders straight for three inches.

Then to make the V neck, every time the yarn is wound toward the center, add one nail on each shoulder piece until the two parts of the knitting meet in the center at E.

Add two nails at A and B on both armholes.

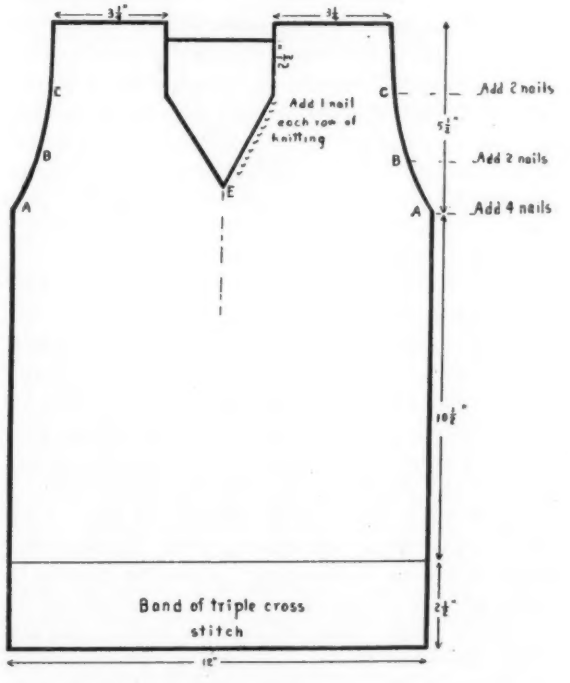
Add four nails at C on both armholes.



Pattern for back of sweater

Diagram No. 4. Boy's Slipover Sweater, 6 to 8 years.

If the sweater is to be buttoned down the front, continue using the two balls of yarn, winding each from the side of the sweater to the center only and back to the side.



Pattern for front of sweater

Diagram No. 5. Boy's Slipover Sweater 6 to 8 years.

Knit 10½ inches.

Change to double stitch and knit 2½ inches to correspond to the band at the bottom of the back of the sweater.

Cast knitting from the rake (see directions for shawl above).

Take up the loose stitches at the lower edge of the back by crocheting once across with a single crochet stitch.

Sew up the under arm seams, matching the stitches carefully, and using one strand of yarn.

To knit the sleeves. Begin to knit the sleeves at the top. Cast stitches on 16 nails in the center of the rake (8 in each row).

Using single stitch, add 2 nails each winding until about 60 nails are in use (30 in each row). The sleeve should measure about ten inches at this point. (see E-F in the diagram).

Knit five rows, then cast stitch off one nail on one side of the sleeve.

Knit five rows, then cast stitch off 1 nail on the other side of sleeve.

Knit four rows, cast stitch off one nail on the first side.

Knit four rows, cast stitch off one nail on the other side.

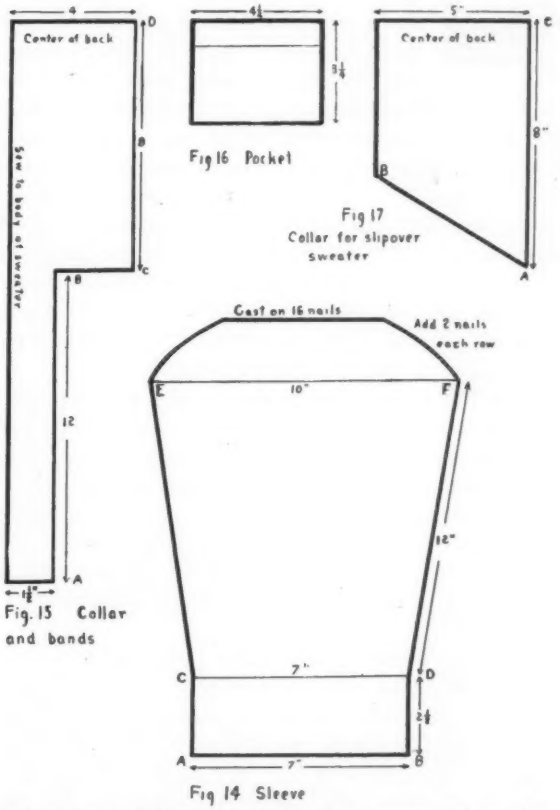


Diagram No. 6. Child's Sweater Jacket (4 to 6 years). Sleeve, collar collar and pocket.

Repeat the last two directions for three times, until six more nails have been dropped, three on each side of the sleeve.

Then every three rows of knitting drop two nails at a time first on one side and then on the other until only 42 nails remain in use (21 in each row).

When the sleeve B to F measures twelve inches, change to double stitch and knit 2½ inches for the cuff.

Cast knitting from the rake.

Knit the other sleeve to match.

To knit the collar and bands for down the fronts, which are made in one piece.

Cast stitches on twelve nails (6 in each row). Knit first band A-B, with double stitch, until it measures the same as the edge of the front of sweater, from the bottom to point E.

With the next winding add 24 nails to the right of the knitting to give the necessary width for the collar. Thirty-six nails are now in use.

Knit the collar about 16 inches long, or the distance from E around the neck of the sweater to E again.

Cast stitches from the 24 nails added above.

Knit the second band, making four or five buttonholes as follows: cast stitches off four nails, beginning at the fifth nail from the edge. Add these nails again in the very next winding.

When this band is as long as the other one, cast the knitting from the rake. Take up the loose stitches at the beginning of the first band, and crochet once around the outer edge of the collar with a single stitch. Crochet around the buttonholes, or finish them with a buttonhole stitch, using a single strand of yarn. Sew the collar and bands to the body of the sweater.

To knit the pockets, cast stitches on 30 nails. Knit 2½ inches of single stitch. Knit one inch of double stitch, then cast the knitting from the rake. Make the second pocket to match.

Knit the belt as long as desired, using twelve nails. Make two buttonholes, about three inches apart near one end.

Ship Ahoy! Where are You Bound?

Gerald A. Boate, Halifax, N. S.

THE VOICE came over the fog to us as we were pulling out of quay. Our inquirer was in a small row boat which was empty save for the rower and his oars. The question which had come up to us through the mist and darkness: "Ship Ahoy, Where Are You Bound?" within my mind loosed the doors of interrogation. I had placed myself on that ship with the slight ceremony of exchanging a traveler's check for a strip of green pasteboard at the steamship agency. I assumed that in due course I would arrive safely at my journey's end, carried both day and night in comfortable quarters, well fed, with a mind free from any planning or effort which would or could either increase my comfort or insure my safety.

I was brought up by the sea and its restlessness always acted as a soother to me, the rolling ship and the sighing of the wind as a lullaby, and sea legs soon adjust themselves to the motion so that during the four days' journey I was able to study a few of the different elements which enable me to be carried over reefs, through darkness and fog, o'er restless sea and howling wind to my destination, in safety and with comparative comfort.

Many minds of men whom I was never to meet had planned the ship, its machinery, and coordinated the two; other men charted the ocean, constructed and tested the instruments of navigation. The men who manned the ship used this equipment with exactness and intelligence, each individual functioning and performing well the task or duties which he was engaged to do at the owner's or ship broker's office before he was entitled to place a foot on board that ship. Each man obeyed the commands of his superior officer upward through the organization until it ended upon the sea, with the captain, who, when three miles from shore, is supreme commander. Every soul upon that ship is subject to his reasonable command.

True To Its Course.

Automatically many tasks are performed as routine duty, everything is made trim and tidy, and covers and lashings are in place. Every precaution is taken to prepare for any trick of wind or weather. Ordinarily the crew are on duty but four hours when the section is relieved by those of the next watch. At every change of watch the navigating officer sees that a careful and accurate record is made in the log book, always kept in one place in the chart house. This record is concise, definite and deals with only one thing, namely, navigating of the ship safely to her destination, observing the elements of time, distance and direction.

A little device trailed far behind in the ocean gives the miles sailed, the compass the direction, the sextant the position, and the chronometer the distance from a definitely known place by the difference in time. After some mathematical calculations, which include many tables and some trigonometry, a verified position is compared with a plotted course which is laid out on a map or chart. Ever through the waters, day and night, the ship steams, and arrives, after traveling twelve hundred miles, within twenty minutes of the time given on the time table.

The underlying reasons for the performance are that the ship, like an individual, is self-contained. There was a definite objective which should be reached in a given time. Frequent checks were made, at least every four hours, to determine what progress was made, and this was checked against the schedule and differences noted. The desired path or paths were previously carefully and accurately charted and this record was constantly consulted, and accomplishment measured against a desired or standard distance. The objective was fixed, and the shortest safe course was taken to reach it. These records or charts are available to all who sail the seas. They are exact and guaranteed by the governments which issued them, zones of safety as well as zones of danger are marked, so that he who sails does not sail blindly, nor does he have to discover the location of a reef by being piled up as wreckage upon it.

How About the Individual Ship?

How about the individual ships, the people who are starting to sail without a pilot or chart, or have sailed into seas in which they cannot navigate? Are they not entitled to a plan or chart which will predict a reasonably sure course that must be followed if they are to arrive with assurance at a place which will provide the desires of life?

Must valuable time be lost trying out several kinds of employment before one suited to the individual's ability is found? Then, the vocation suitable may not be the one most highly desirable. It seems to me that we educators, or "Human Engineers," have a very definite task before us in assisting in the elimination of human waste. Intelligent vocational guidance is more than mule packing or stock-yard bunching.

Vocational guidance implies the diagnosis of the individual case and the suggesting of a program which must be followed and checked. To do this with any degree of success the counsellor must have comprehensive and accurate compilation of data concerning all principal occupations. This data must be constantly revised, added to, and discarded as conditions change. The counsellor must have a wide knowledge of human nature. He or she (males should counsel males and females, females) must have a wide knowledge of human nature, the mental qualifications and training necessary for each class or grade of occupations.

It is necessary that the counsellor have more than the beginning of wisdom. Occupations cannot be visualized by reading literature, or texts relative thereto, but a varied industrial and business training should be the foundation on which the counsellor must build his facts and factors, which will serve him as a truly worthy pilot to those who are placing their future success or failure at his mercy. Another conclusion is that a counsellor cannot settle an individual's career in a half hour's interview.

Testing Capacity and Ability.

The systems of character analysis at present are not scientific, with the exception of that employed by music teachers in testing for natural musical ability. Most of the so-called trade tests so far conceived are a collection of questions selected at random by questioning artisans of various kinds which, when applied to a job seeker, merely test his familiarity with various tools or processes. They test lack of ability or lack of capacity rather than unquestionable ability or capacity for specific occupations.

Scattered all over America there have been bureaus, ranging from the privately owned to civic, state and federal. All seem to use the same basic ideas. The major one is to secure, by skillful questioning, all possible information concerning the applicant, or have the applicant fill in a questionnaire while seated in the counsellor's office. The applicant is usually ill at ease and often has snappy questions asked him which are irrelevant to the task at hand, the tone used by the interviewer being a splendid imitation of a police sergeant at the docket. If the counsellor has the happy human faculty of extending and radiating friendliness and confidence the case may be diagnosed with a minimum of discomfort and the applicant often will diagnose his own case and oftentimes suggest the remedy.

Interviewing is more successful where a preliminary interview is first secured upon which a brief but satisfactory record is made. An appointment for a second interview is fixed within three or four days, at a definite hour. This appointment should be kept by both the interviewer and the interviewed punctually. Interruptions and bench lines do not invite confidence. The second interview should lead to the formation of a definite policy. It is at this point essential that the counsellor shall avail himself of his records of a wide range of occupations and their places in modern industry; what qualities and qualifications are necessary to enter them; what training is necessary; what the future development may be.

During these reconstruction days employers are, and will become, more discriminating about the personnel they employ. Labor-saving devices will be related to plans and schemes which will save worth-while employees to the organization. Successful counselling leads to three things:

The Man; the Place and the Job.

The employer is entitled to know the following about the applicant; mental traits, aptitude, general education, job training, technical training, experience and where and how he lives, his habits, pastimes and amusements, whether or not he is progressive or aggressive, capable of being developed into a thinking leader, or an individual who can see about a week's pay ahead and will wander off to a competing organization for a small immediate gain.

The employee is entitled to know at least a few things about the business or industry which is to buy his time. The counsellor should be able to supply information about the location of the industry and its suroundings, whether or not it is attractive and easily reached by good roads, train or trolley. He must also know what the general working conditions are; about the equipment—whether or not it is modern and properly laid out. The policies of the firm are of vital importance; their interest in employees, and their method of rewarding labor. What is the general environment? Is employment steady or seasonable, given to the peaks and valleys? Is production forced until warehouses are filled and employees laid off at periods of the year when the greatest hardship is felt? What are the living and housing conditions in the district? The internal and external surroundings of the industry and the civic conditions of the community should be known. Any public health centers and amusements which are at least partly supported by the industry must be ascertained. What has been provided for additional training which directly leads to promotion? Is the industry specialized or general? Are the methods of doing work or carrying on business generally accepted as good practice?

Three Types of Management.

The organization to be understood should be charted. Some lend themselves readily to graphical analysis, others are a shifting bed of sand and unstable in every way. Broadly speaking there are three types of management:

First: The plant operates in a simple routine fashion, manufacturing a simply product which is usually stable. Such plants are usually under the control of one man. The organization consists of a very simple chain, the first link of which is the superintendent about whom all activities within the plant revolve. He undertakes and controls all functions after an order is taken. This superman is the last authority in the plant, power, equipment, supplies, bookkeeping, purchasing, hiring and firing, paying, and routing. The work which embraces a plan or decision, or requires the formation of a policy. Usually this superman received his training on the job and was an expert in a mechanical line. He by nature has great capacity for absorbing detail and making sound decisions, or at least thinks he has. This type of organization predominated from 1870 to 1900 and is still to be found in many small plants where between 200 and 300 men are employed. When the "old man" was away manufacturing and business was at a very low point, because authority to carry on was never delegated to any subordinate. Profits were usually figured once a year by the simple process of subtracting gross operating expense from gross sales.

Second: Into this group falls the larger plant with a more varied industrial organization, but dominated by one man as to all of its policies and activities. Thus, the vision, although often broad, is limited to the vision of one individual. Such an organization is autocratic fundamentally and is prone to err in the formation of executive policies. The two chief assistants are success and failure who sit on either hand of the "super" and await his bidding and their turn to serve according to his resourcefulness, forcefulness or digestion. Endless detail finds its way into this inner sanctum because he only can decide. Delays are numerous and costly and each new wind shifts the sands which form the policies. Nothing is final without the sanction of the Big Chief. Subordinate executives soon fall into the class of helpless passiveness and become wielders of a rubber stamp.

Third: The process of organization expanding business and industrial organization, covering a wide range of territory and at times many activities, have caused management to separate itself from capital and its timidity. In widespread business it is impossible to do other than decentralize and delegate authority. This has led to the building up of many businesses in which many executives function, each being a specialist in his own division.

Vocational Counsellor the Link.

Let me repeat vocational counselling leads but to two paths: training to adequately prepare to function in commerce or industry, or to obtain definite information on which to equate an individual to a satisfactory position. Educators and the community at large are keenly interested in these two absorbing paths.

If training is feasible and desirable the vocational counsellor should be the connecting link between the applicant and the school. A competent guide should be provided who will see that the trainee is not placed in the class where there is the most room but in the one best fitted to train him for his objective.

Also there must be co-ordination of training schools with commerce and industry, so that the period of passing from the school to gainful occupation will be a slide, not a jar or jolt. Representative employers will through council, and collectively through forming advisement boards, greatly assist the vocational counsellor and the school. Such assistance will surely make the school an institution of community service.

Citizens serve in any capacity which influences the policies of the school. Those holding honorary positions who are non-active should give way to men who will consider service above self and get under so that they may give the movement a shoulder shove. There may be as many committees of three or five as there are occupations taught in the school. Men and women selected as assistant advisory counsellors should be selected on account of their superior business or industrial knowledge.

Most people who have a really worth while outlook on life will spare a minimum of one hour a week

for a period of six months. These boards composed of small groups of representative men and women have assisted, to the writer's knowledge, in satisfactorily training and in placing several thousand adults who otherwise might have been human wreckage.

The training schools should possess modern up-to-date equipment and be typical of whatever phase of comerce or industry it attempts to train for. The instruction staff should be selected on acount of its industrial and business experience and be able to hold its own in industry, be up-to-date in methods, and be of a moral type which may be classed as character builders. Its program should be so aranged that beside instructional duties there is an opportunity to interview in the counsellor's office and follow up students who have passed on to the ranks of wage-earners. The written records of those who have gone out are the best index of the successes and failures of vocational counselling.

Ultimate Consumer Will Judge.

In conclusion, remember the pupils who have gone out are the product of the educational manufacturies, and the ultimate consumer will judge the work by the articles which he may either demand or reject. It would indeed be deemed a very short-sighted policy for a manufacturing firm or business to merely dump its product just outside the doors and let it market and distribute itself.

Remember that modern business has spread into a chain which embraces: Organization and control, plant management, merchandising and marketing; accounting, cost finding, credit, financing; business correspondence; advertising; inland traffic and foreign trade and shipping; banking principles and exchange; insurance; office management, auditing and commercial law. All of these fields are external and necessary that a product may be marketed.

In order to produce the product there must be: buildings, power plant, mechanical equipment, drawings, patterns, tools, and material handling. In order to operate it there must be labor which must be compensated, work which must be planned, and studies made of operation time and item costs. Purchases of material made must be followed by records for the receiving, storing and issuing of the same.

Training is necessary either in the office, the plant, or in the school in order that the various phases of financing, manufacturing, distributing and marketing may be satisfactorily carried out. The long chain of service, from the raw product to the ultimate consumer, needs strong, well formed, and well forged links in order that the undesirable snapping of the weak link may not occur.

Vocational guidance and training extends far beyond the mere training of artisans or machine workers. A convalescent business world is carefully opening its doors to start housekeeping once more. The walls of most plants ring back an echo of your voice as you enter. She calls for capable workers and doers and not job holders, and will look to the school for aid as never before. Will they reply: America, I am Ready, Ship Ahoy- We are ready, name the port.

PROF. L. D. HARVEY DEAD.

The death of Prof. Lorenzo D. Harvey, President of the Stout Manual Training Institute, Menomonie, Wis., which occurred on June 1, 1922, removes one of the great pioneers of vocational training in the United States. His eminence in this branch of educational effort, owing to his many years of service and the character of his work, is well known throughout the country.

Mr. Harvey's career as a schoolmaster began at Sheboygan, Wis., where he served as superintendent in 1875. His activities soon widened in institute and normal school work. For six years he served as instructor at the Oshkosh Normal School and in 1892 he became the president of the Milwaukee Normal School, in which capacity he served for six years.

DR. L. D. HARVEY.

He was then chosen state superintendent of public instruction. In this office he manifested remarkable leadership. His aggressive championship for better things in the educational life won for him a strong following in the state. He was able to realize many of his legislative recommendations through his great sincerity and inspiring personality, and to lead the teaching profession of his state to higher aims and service. In 1903 he was chosen as head of the Stout Manual Training Institute in which capacity he served until the time of his death.

During his term as a state superintendent he also came into national prominence. His forceful platform oratory, incisive discussions on pending problems, and his progressive attitude on educational tendencies commanded attention of the school public throughout the country. In 1908 he was elected president of the National Education Association. His writing on educational topics, principally in vocational lines, have been considerable.

Lorenzo Dow Harvey was born November 23, 1848, at Deerfield, N. H. After receiving a common school education, he prepared himself for his future calling at Milton College, Wis., where he received his A. B. degree. Those who came into personal contact with Mr. Harvey were always impressed with his geniality, his conversational powers and his fine sense of humor. He was always a splendid man among men, a lovable character, a loyal friend, and withal a true leader in the field of industrial education.

INDUSTRIAL-ARTS MAGAZINE

E. J. LAKE S. J. VAUGHN
Editors

EDITORIAL

COMMERCIALIZED.

The person who would promote ideas or projects gets but a little way with his plans before the problems of finance and commercial method must be considered. It matters little whether the project be one of moral, aesthetic or educational purpose; there is no possibility of affecting the sensibilities of many people without resorting to some form of commercial enterprise.

This fact alone makes it necessary to combine industrial and commercial training with the development of the individual in the use of his talents. Education can no more hold itself aloof from commercial and industrial interests than it can disregard the physical materials and conditions of life.

The charge of commercialism that is so often brought against religious and educational movements is usually unfounded. Those who go in for making money by extortion or unfair profit choose other fields of endeavor than these. Religious and educational impulse are now too well understood to be exploited successfully.

We hear occasional regrets expressed concerning the commercialization of art. We presume that "commercialized art" is art that is made the object of barter; art bought and sold at a profit. We wonder how artistic things could be dispensed in fairness to the artist otherwise than by commerical transaction. It is evidently one of the artist's serious problems to market his talents.

With the conviction that trade is essential to the proper distribution of all good things the charge of commercialism which one hears applied in condemnation implies that the things of most ready sale are not good. On the other hand nothing can be good in art that is not appreciated. Some of the finest products of the artist have been lost for a time for lack of appreciation. The enjoyment of art measures its value. That enjoyment is the object of education and gives to the work of art a value which makes it commercial. Trade is the great distributor of all desirable things. Let all of our valuable commodities be commercialized to the fullest extent and not withheld selfishly by private interests.

TEACHERS DISAGREE

At a recent meeting of teachers of the industrial arts one speaker on the program who was considered an authority on methods of teaching, made the remarkable assertion that appreciation of art could in no wise be developed through drawing. The speaker who followed was of equal experience and authority He stated with emphasis that drawing was the readiest method of developing interest in beauty of form and construction. So do authorities disagree on methods that many faithful teachers have assumed to be of established value. Methods of teaching will probably always be subject to discussion. Even the established facts of science are frequently denied by persons who jump to conclusions on little evidence. We are living in a time of revelations and the wildest guess will get a temporary hearing. We are living in a time of much exchange of opinion and the temptation to overstate opinion in order to attract attention is not easily resisted. So one who will listen may hear strange and revolutionary doctrine that sounds plausible but is not convincing on second thought. The only safeguard against those who listen to opinion is individual opinion based on experience. The only safeguard against first thought is thought raised to the nth degree and verified by actual experiment. Even the result of experiment must be considered in the light of conditions. It is probable that many people have a fine appreciation of art and music who can not draw or play or sing. It may be true that some who have attempted to draw or play or sing have been limited by their poor performance to a less appreciation of the arts than they could have acquired otherwise. There is much evidence that the best way to teach in classes is by careful adjustment of precept and practice so that some definite project is carried out by each individual under the guidance of a trained expert and abundant examples of the finest production is used to give a standard of excellence. It is on this assumption that our schools have developed into shops, laboratories and atheneums in one.

BIG WORDS.

"This is a fine, rhythmical day," said the precocious pupil to his teacher. "Well!" replied the astonished teacher, "a harmonious and well-balanced day, I hope." Balance, rhythm, harmony had been harped on in design until the pupils had caught a vague sense of meaning for the words but had little discrimination in their use. Some of our teaching is of that sort. We use words freely and without clear application to definite example so that our pupils get their heads full of high sounding terms and apply them as best they can to some experience.

"Tardy pupils will be dropped from the register," said the stern teacher as Mary slipped into her seat three minutes after the bell.

That evening Mary informed her mother that if she was tardy again the teacher would put her in the fire. The school register covered a pit of fire according to Mary's experience.

We are told by those who teach ignorant foreigners the elements of our speech that words must be fitted to objects not objects to words. Language was devised to describe things and not things to fit words. So must words be the expression of some experience and the experience will assure understanding of the word even if it be as long and peculiar as the last of an old time

spelling match. So will the graphical and industrial arts give to us a much enriched vocabulary if words are found to express the things and effects produced.

BETTER TIMES AHEAD.

There's a bit of optimism in the air as school closes for 1921-22. The tide of business depression is perceptibly ebbing.

In many ways this has been a difficult year. Policies of retrenchment have been adopted in many places and there has been a decided uncertainty and nervousness, in all matters of finance, materials, building programs, salaries, etc. Even though the year has been a difficult one, the schools and school work have fared surprisingly well. With prices and costs settling and with the summer and early fall in which to complete the readjustment, the schools and school people may look forward with assurance to the new year.

This cheerful note in business as well as in education has been in no small degree due to the optimistic spirit and teachings of those faithful, undisturbed teachers who refused to become panicky when the rest of the world was panic stricken.

THE CONTINUATION SCHOOL.

If anyone expected our experiences with the continuation school to be different from what they have been, they must have been reckoning without a full knowledge of the history of this movement and of our teaching resources. That our continuation school efforts have not brought the results hoped for by overanxious friends is due to numerous causes. First, many of the teachers in these schools have never caught the vision of their opportunity. In the second place, a very large number of them have not had adequate or ideal preparation for the work which a continuation school program demands.

Even yet, there is great confusion in the educational world as to the meaning and purpose of such a school. A satisfactory program of work for continuation schools has not yet been formulated and put into general practice. Satisfactory textbooks have not yet been written. Adjustments to the working schedule of the students have not in all cases been satisfactorily made with the educational system on one hand and the industrial and commercial world on the other.

But why so soon despair? Why be in such a hurry to pronounce judgment upon an educational departure that must at best require a considerable term of years to work out even a tentative program and body of material, method, and practice.

The continuation school is the only device yet proposed that is designed to do something for the working boys and girls. In a few states where it has had able leadership and sympathetic trial under favorable conditions, some perfectly wonderful results have been produced. A method has been discovered for this type of teaching. A balance has been established between the academic or general courses and the shop courses. A cooperation has been promoted between the school and the working world. Lesson plans have been worked out that give promise of usable textbooks for this type of work. The working boys and girls have been studied in their working tasks and environments. Aptitudes have been discovered and classified. Guidance, employment, and adjustment agencies have been perfected. Thousands of boys and girls have renewed their ambitions or have developed different ones. Others have found inspiration and hope in the instruction and guidance the few hours per week have furnished. Many a young person has found his or her way back into full-time schools through the assistance, advice and training of the continuation school. And many a task in the working world has taken on new meaning and significance through the lessons in the continuation school.

The continuation school has justified itself and the hopes of its friends wherever it has had a reasonably fair trial under reasonably competent direction and instruction. It deserves a better chance than it has had, for it has in it some sound and vital principles and some virtues worthy of a permanent place in our educational program.

VOCATIONAL COUNSEL TO YOUNG MEN.

H. E. Stone, Boys' Counselor, Erie, Pa.

1. It is better to choose a vocation than merely to "hunt a job."
2. No one should choose a vocation without careful self-analysis, thorough, honest and under guidance.
3. A wise choice of a life work requires a knowledge of the requirements and conditions of success, advantages and disadvantages, compensations and opportunities in different lines of work.
4. Every young man needs careful and systematic help by experienced minds in making the important decision as to how he shall spend his life.
5. The growing complexity of our industrial organization has multiplied opportunities for employment. It has also increased the difficulty of obtaining accurate information with regard to them.
6. Unfortunately the avenues leading to blind-alley jobs were never so numerous or so crowded as they are today.
7. The choice of an occupation has an important bearing upon the life of the individual and his relation to the state.
8. If the choice of a life occupation is settled unwisely or not settled at all the state must pay in decreased efficiency, increased pauperism, and bad citizenship.

TEN REASONS FOR TEACHING MANUAL TRAINING.

F. M. Groshong, Supervisor of Manual Training, Portland, Ore.

1. Manual training develops handiness, initiative and resourcefulness.
2. Manual training provides a means for developing technical skill and aids in the discovery of special interests and aptitudes in individual boys.
3. Manual training is mental training, and judgment-forming education.
4. Manual training offers the boy an opportunity to do a man-sized job from its inception to its completion.
5. Manual training introduces the boys to a working vocabulary of terms common to American trades and industries, and awakens an interest in the work of the world.
6. Manual training develops an appreciation of industry and instils within the boy the invaluable habit of work.
7. Manual training directs and builds upon the natural instinct of the normal boy for making things, through problems that are varied, interesting and practical.
8. The manual training teacher is sometimes the only positive male influence the boy meets at school, and often becomes a powerful factor in moulding his mental activities during the important adolescent period.
9. The practical shop methods and industrial content of Manual Training are incentives to keep the boys in school.
10. More important even than the training given in tool manipulation and the actual construction of projects, is the attitude created in the boy toward his work, his fellowworkers and American industry.

"Youth should be a season of instruction in industry and the useful arts, as well as in letters and the sciences. Each child should be trained to skill and efficiency and productive labor."—Horace Greeley.

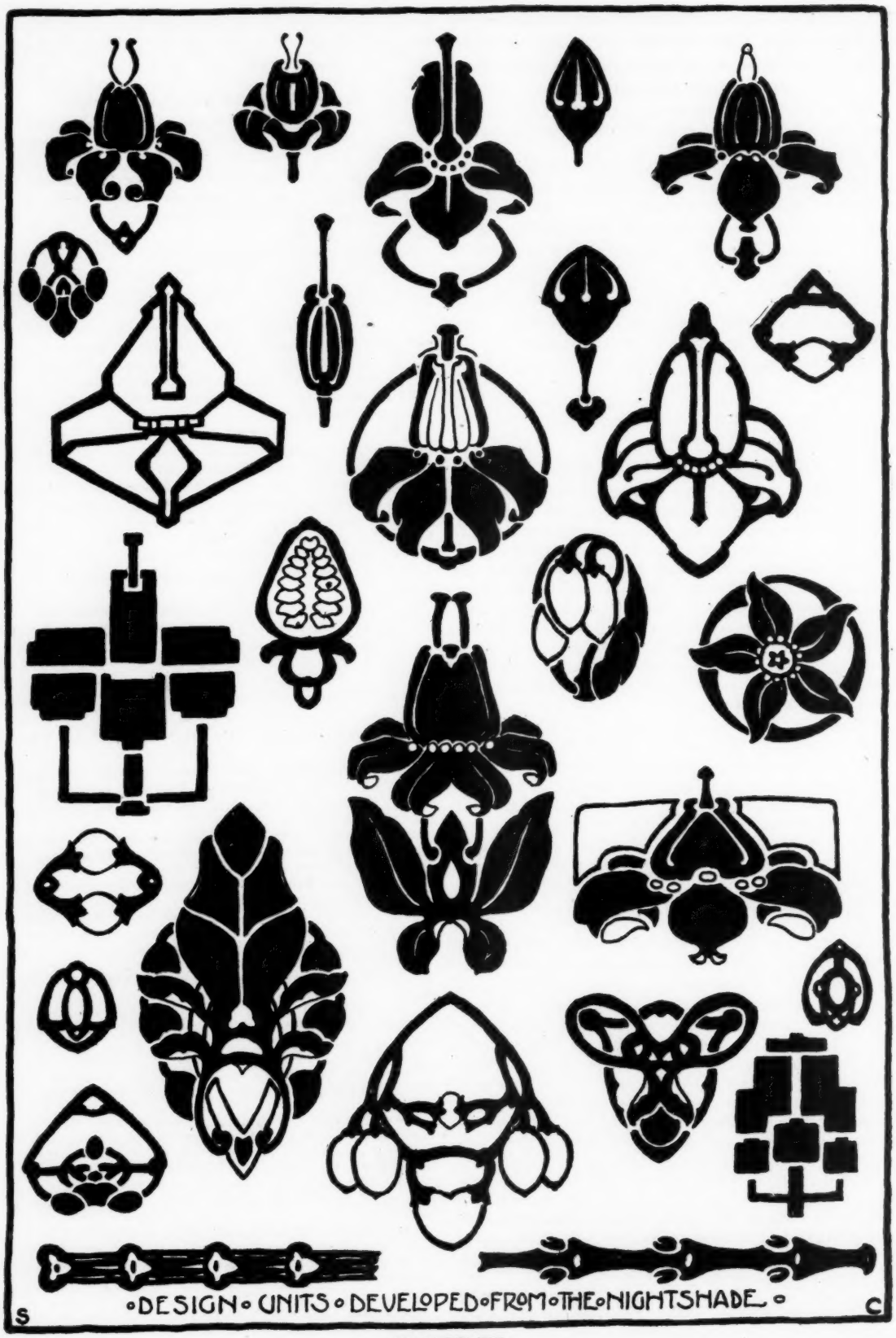


PLATE V

This plate, which illustrates designs developed from the night shade, is the fifth of a series of twelve plates, by Miss Sara Cohoon, instructor of art in the Junior High School, Springfield, Mass.

PROBLEMS AND PROJECTS

The Department of Problems and Projects aims to present each month a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration. The editors will not accept the old hackneyed problems of footstools, taborets, towel holders, etc., which have been made from time immemorial, ad nauseum.

Drawings and manuscripts should be addressed: The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

SWING CUT-OFF SAWS.

Chas. W. Frost, Philipsburg, Mont.

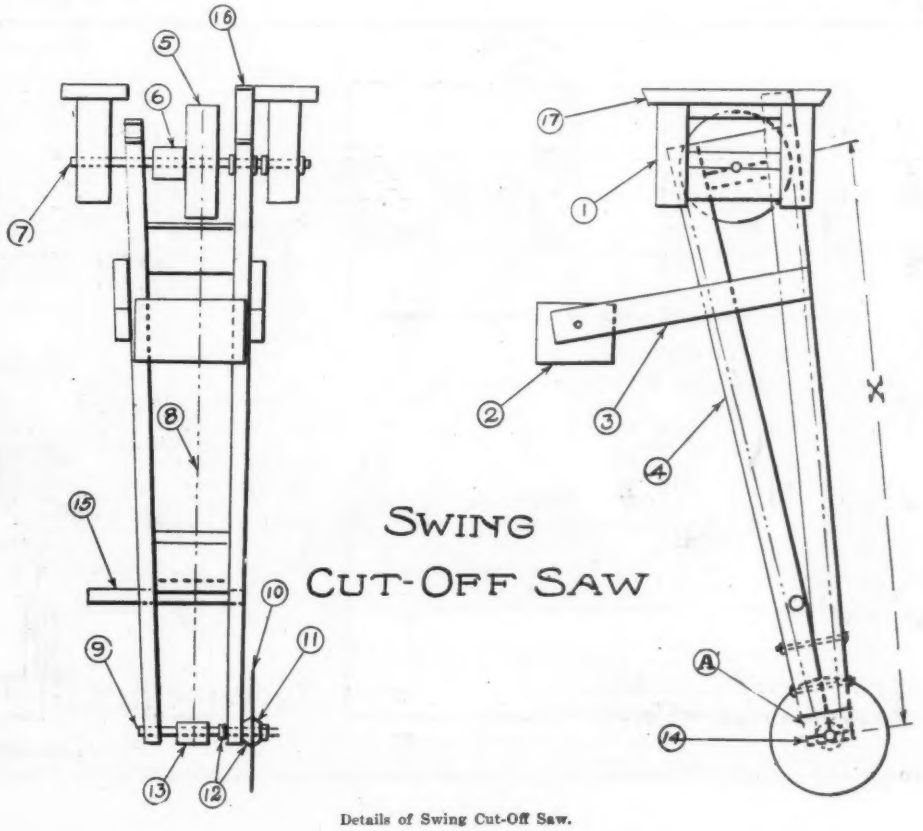
A *SWING cut-off saw* with convenient tables is one of the most efficient labor-saving devices that can be installed in any woodworking plant. By its use long, heavy lumber that could not be handled on the ordinary saw table can be cut to any length. Any number of duplicate pieces can be cut with time spent measuring and marking but one.

Swing cut-off saws are of two types; those with overhead, and those with underneath drive. The principle involved is the same in each, so while the overhead type only is shown here any mechanic can work out the details of a machine hung on a floor shaft.

The home made swing cut-off saw illustrated here consists of a stoutly braced wooden frame hung from its top end in babbitted bearings upon a driving shaft near the ceiling, and carrying a saw arbor in babbitted bearings at its lower end. Upon the shaft and between the upper ends of the swinging frame are two pulleys, the larger of which is connected with the saw arbor pulley by a three inch endless leather belt. The smaller pulley is driven either from the motor or shop counter shaft instead of a special shaft of its own. In this shaft, unless the swinging is hung upon the shop counter case the small pulley is omitted. Firmly bolted to each side of the swinging frame near the top, and projecting about two feet in front of it are wooden bars near the outer ends of which is hung a weight box similar to that on the belt tightener of the hand block sander.

The Swing Cut-off Saw frame must be very strongly built, with its members carefully mortised and bolted together. The lower ends of the side pieces are mortised into the pieces that carry the upper halves of the saw arbor bearings. ("A" in drawing).

Using a cross cut saw fourteen inches in diameter, and with a distance between centers of the shaft and



Details of Swing Cut-Off Saw.

saw arbor of six feet the machine illustrated here will cut through a board one inch thick and twenty inches wide, or through a post six inches square.

In use the board to be cut is placed upon the table with end edge against the stop at the front, and the saw is drawn forward through it. Upon completing the cut the operator simply releases the handle, when the weight returns the saw to its normal position, ready for another cut.

The weight required depends upon the material of which the frame is made, size of saw, etc., hence is not given but should be just sufficient to draw the saw back promptly and without undue jar.

One type of hanger that is very easily constructed is shown in the drawings.

It is important that the saw arbor of this machine be thoroughly oiled as it is necessary to run at high speed to do the best work, hence it is advised to attach either oil cups purchased from the hardware store or "home-made" cups. These are made by soldering a short piece of auto oil feed pipe into the bottle neck of a high power rifle cartridge, sawing off the head of the cartridge, and screwing the copper tube into a hole in the babbitt bearing, above the shaft. The tube can be lightly threaded and screwed into the babbitt without first threading the hole. If the neck of the cartridge is too large to fit the copper tube it can be drawn down to the proper size by driving into a hole in an iron plate somewhat as dowell pins used to be made. A thirty caliber government cartridge will hold sufficient oil to lubricate one of these bearings for quite a while.

Names of Parts.

1. Hanger.
2. Weight box.
3. Arms.
4. Swinging frame.
5. Saw driving pulley.
6. Motor driven pulley.
7. Shaft.
8. Saw driving belt.
9. Saw arbor.
10. Saw.
11. Babbitt washer.
12. Babbitt collars.
13. Saw arbor pulley.
14. Arbor bearing cap.
15. Operating handle.
16. Saw stop.
17. Sealing beam.

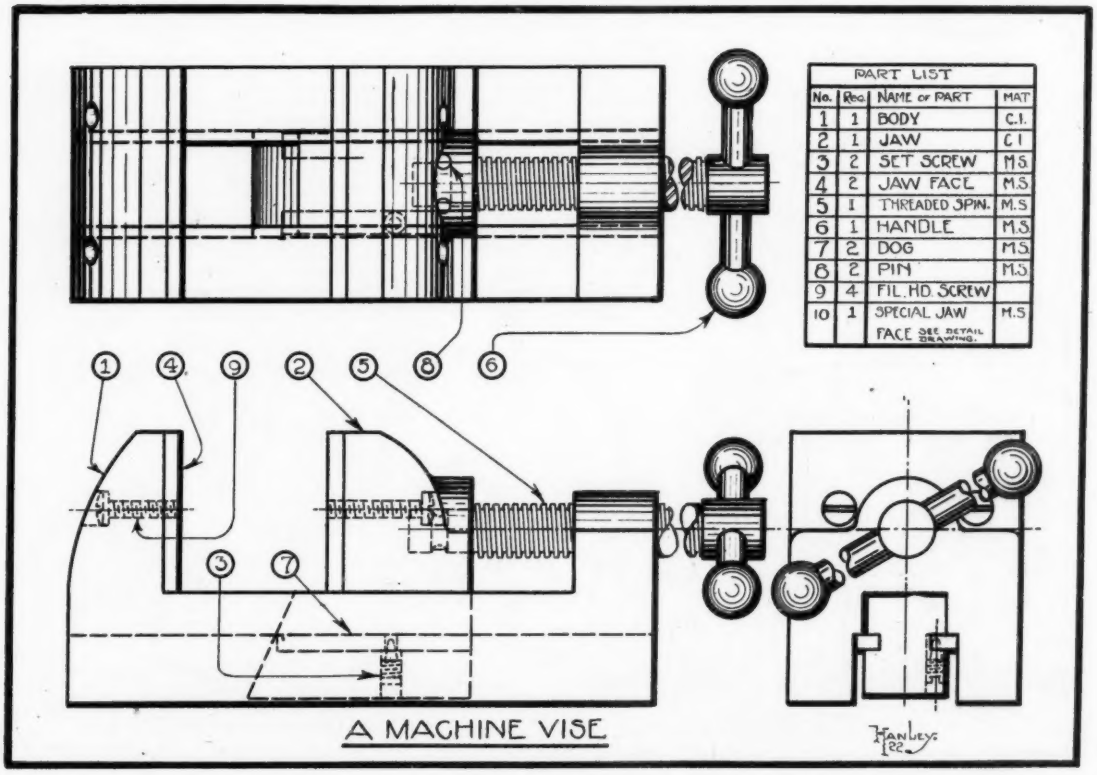
A MACHINE VISE.

Edmund C. Hanley, Muskegon, Mich.

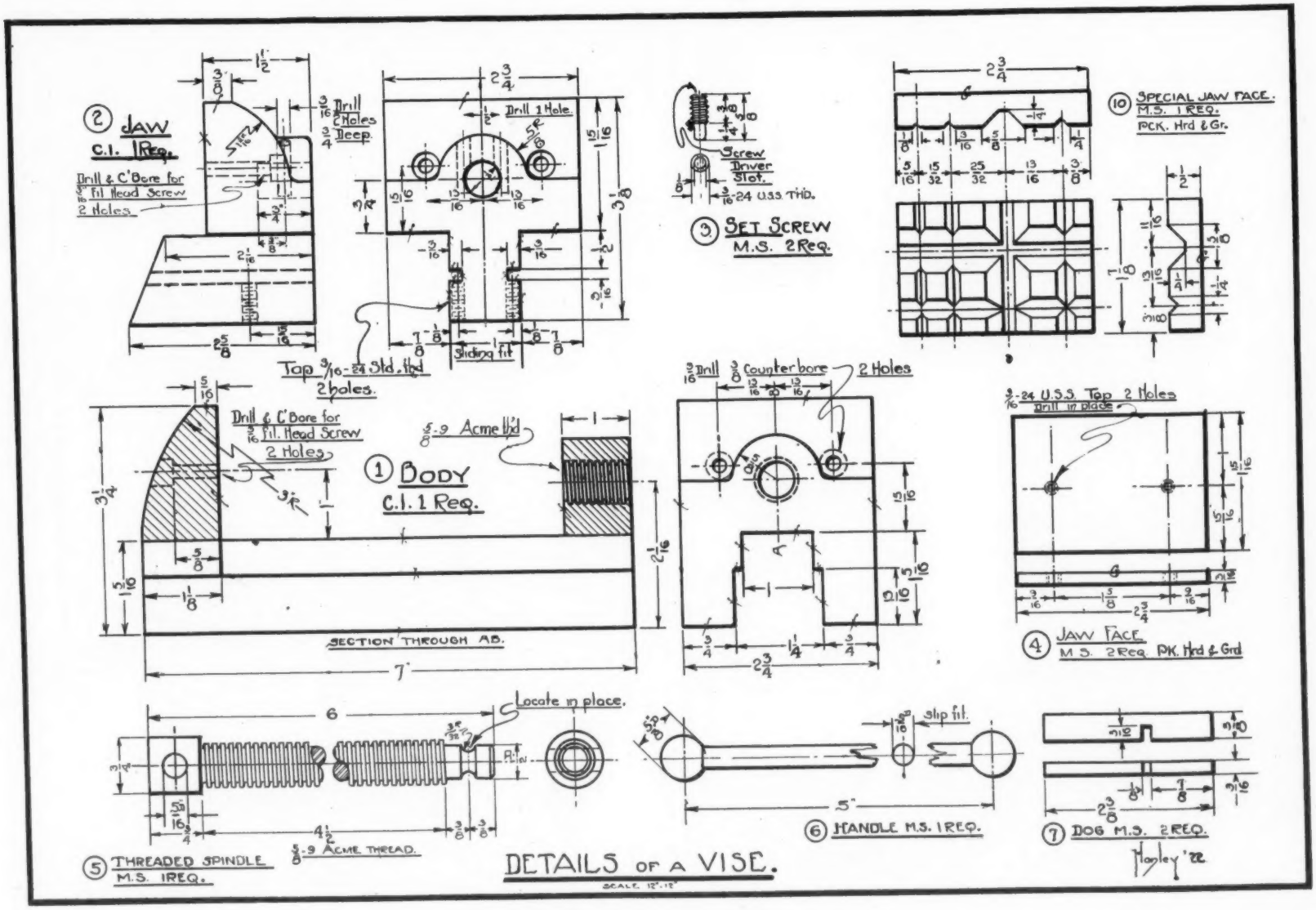
A problem which affords excellent training and also an opportunity for correlation in mechanical drawing, pattern making, foundry and machine shop, is that of the little vise as shown in the accompanying drawings.

In the pattern construction of the vise body, detail No. 1, several methods may be worked out. For instance, the pattern may be so constructed as to involve either a vertical or horizontal baked core in the foundry practice, or the construction changed so as to involve a green sand core and the pattern worked out on a plate. In so doing the plate may be made more complete by including the movable jaw, or the pattern may be made solid, still involving the green sand core and the pattern made to include a match or follow board.

In the foundry practice great care will have to be exercised to avoid shrink holes in the castings. The gate might best be placed at the end of the body including the jaw, as this part of the casting has the bulk of the metal and can depend on the sprue to make up for the shrinkage, if one of the boys will keep the metal in the sprue hole, and also in the mold, in circulation with a feeding rod. The evil of the shrink holes, which are sure to come if not guarded against, may be stopped by


PART LIST
No. | Req. | NAME OF PART | MAT
1 | 1 | BODY | C.I.
2 | 1 | JAW | C I
3 | 2 | SET SCREW | M.S.
4 | 2 | JAW FACE | M.S.
5 | 1 | THREADED SPIN. | M.S.
6 | 1 | HANDLE | M.S.
7 | 2 | DOG | M.S.
8 | 2 | PIN | M.S.
9 | 4 | FIL. HD. SCREW |
10 | 1 | SPECIAL JAW FACE SEE DETAIL DRAWING. | M.S.
A MACHINE VISE
HANLEY '22

Assembly of the Vise.


② JAW
C.I. 1 Req.
Drill & C'Bore for 3/16 Fil Head Screw 2 Holes
Drill 2 Holes 3/4 Deep
Drill 1 Hole
Tap 3/16-24 Std. Hd 2 holes.
Sliding fit
③ SET SCREW
M.S. 2 Req.
Screw Driver Slot.
3/16-24 U.S.S. THD.
⑩ SPECIAL JAW FACE.
M.S. 1 REQ.
PCK. Hrd & Gr.
① BODY
C.I. 1 Req.
Drill & C'Bore for 3/16 Fil. Head Screw 2 Holes
5/8-9 Acme Hd
SECTION THROUGH AB.
3/16 Drill 3/8 Counterbore 2 Holes
3/16-24 U.S.S. Tap 2 Holes
Drill in place
④ JAW FACE
M.S. 2 Req. PK. Hrd & Grd
Locate in place.
⑤ THREADED SPINDLE
M.S. 1 REQ.
5/8-9 ACME THREAD.
⑥ HANDLE M.S. 1 REQ.
slip fit.
⑦ DOG M.S. 2 REQ.
DETAILS OF A VISE.
SCALE 12"-1'
Hopley '22

introducing a couple of nails into the mold at these places which will act as chills, thus hardening the iron in these places as soon as it arrives.

In the machine shop the vise affords the student a variety of work. Several methods of procedure may be taken in the machining of the casting on the milling machine and shaper. The vise also affords the student an opportunity for work on the lathe including the cutting of thread. Consisting of several parts, the problem of assembling enters into the work and the beauty and value of the finished product depends upon the accuracy with which the several parts have been machined.

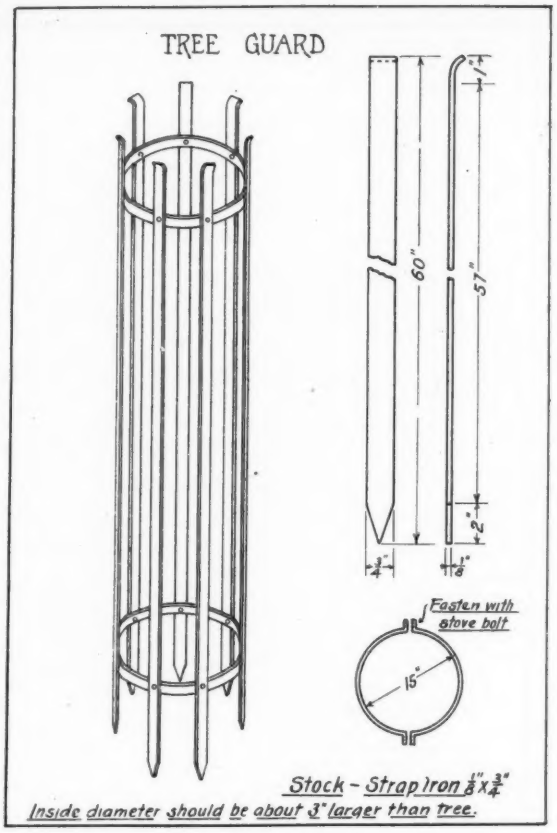
The threaded spindle, detail No. 5, is attached to the movable jaw, detail No. 2, by means of two pins. The one-half inch hole for the end of the spindle is first drilled in the jaw and then the spindle inserted as far as possible. It is then held there rigidly as the two holes for the pins are drilled. In so doing, a section of the holes fall on the spindle. The spindle is now removed and placed back in the lathe and a groove cut all around the spindle, at this location, as shown in the detail drawing. In the final assembly, the movable jaw is held to the body by two "dogs," detail No. 7. After the jaw is placed in the body the 3/16" grooves should exactly line up with the offset in the inside of the straps of the vise. If they do, the dogs may be slid into place, and held there by introducing up through the bottom of the jaw the two set screws, as detailed in No. 3.

The vise when completed will find a most practical use in almost all of the shops and a splendid model for the drawing room. The special face, detail No. 10, is provided for holding round stock and greatly increases the value of the vise.

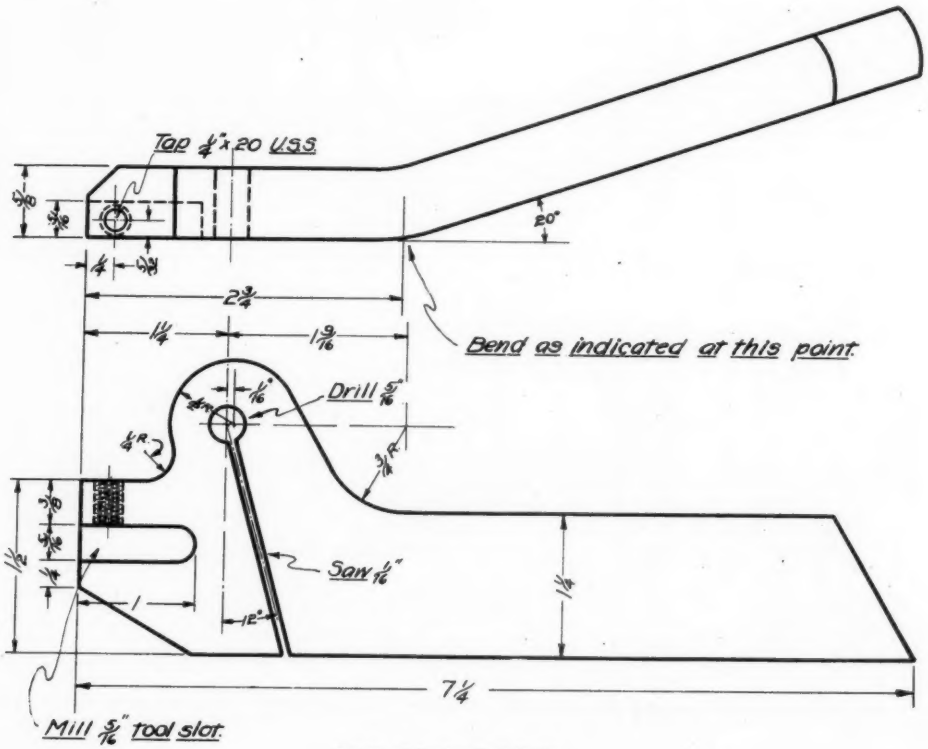
SPRING TOOL HOLDER.

Charles L. Conroy, Manitowoc, Wis.

There seems to be a tendency in many school machine shops to overlook some tools, which are really essential to obtain good results. It is essential that the student



Details of Tree Guard.



Details of Spring Tool Holder.

become accustomed to the use of the tools which he will later use in the industrial shop. One of these is the spring tool holder for cutting threads. This tool is valuable in using small forming tools such as cutters, for ball races, doing away with the chatter usually encountered in finishing the race surface. The main use of the tool holder is in threading operations. A perfectly cut thread is obtained with a smooth surface which is almost impossible to obtain with a solid tool.

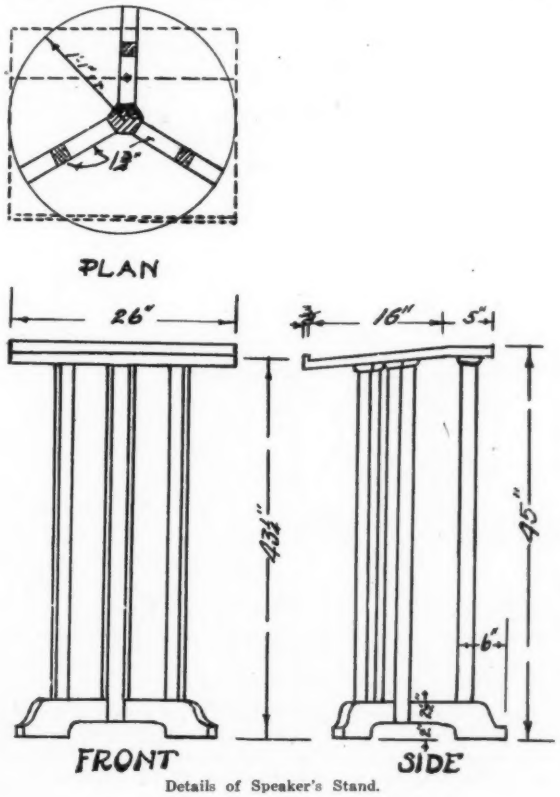
A mild tool steel will give better spring action but I have found cold rolled or machine steel to be satisfactory for general use. A piece of steel 7¼″x2½″x⅝″ is polished on one side and blue vitriol applied to prepare the surface for the layout, which is then scratched on the coppered surface exactly as shown in the drawing. A series of drilled holes spaced just outside the outline will enable the tool blank to be removed. Then the blank can be set in a shaper and all metal removed down to the finished outline. The tool slot is then milled in, making it either 5/16″ or ⅜″ according to the size desired, although 5/16″ will usually be found large enough. Then drill the 5/16″ hole and also drill and tap for the tool set screw as indicated. To allow clearance for spring action, a slot is cut through from the bottom to the 5/16″ hole at the top at an angle of about twelve degrees. After the tool has been machined out it is then heated at the point of bending and the front part placed in a vise. Then a bend is made as shown, care being taken not to distort the plane of the bottom. If made of cold rolled steel, the tool can then be case-hardened, after being finished with a file and emery cloth.

As noticed in the top view of the drawing, the corner of the tool which is near the dead center is beveled off, this being done to enable the operator to work closer to the center. This style of threading tool holder will be found very simple to make and yet will do perfect work.

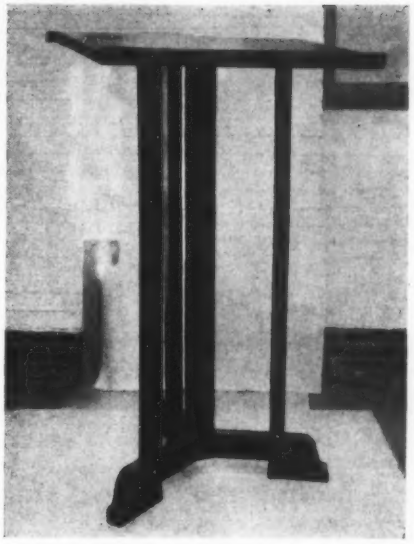
TREE GUARD.

F. D. Connard, Webster Groves, Mo.

This problem is one that can be used in beginning metal work and involves only the most elementary principles. The guard protects the tree where it is most likely to be injured. The round pieces may be bent around a cylindrical object of given diameter, depending on size of tree and cut into half after bending to insure a perfect circle.



Details of Speaker's Stand.



The Speaker's Stand.

KIDDIE ROCKER.

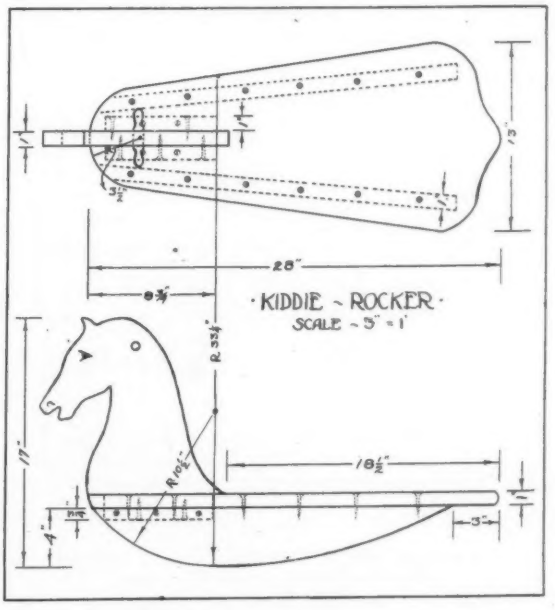
Howard R. Porter, Ellensburg, Wash.

For the little fellow of creeping age, mastering this old Dobbin forms quite an adventure. Its width and the fact that it is so close to the floor make it quite safe. It cannot tip over. Painted in bright colors it makes a pleasant addition to the play room.

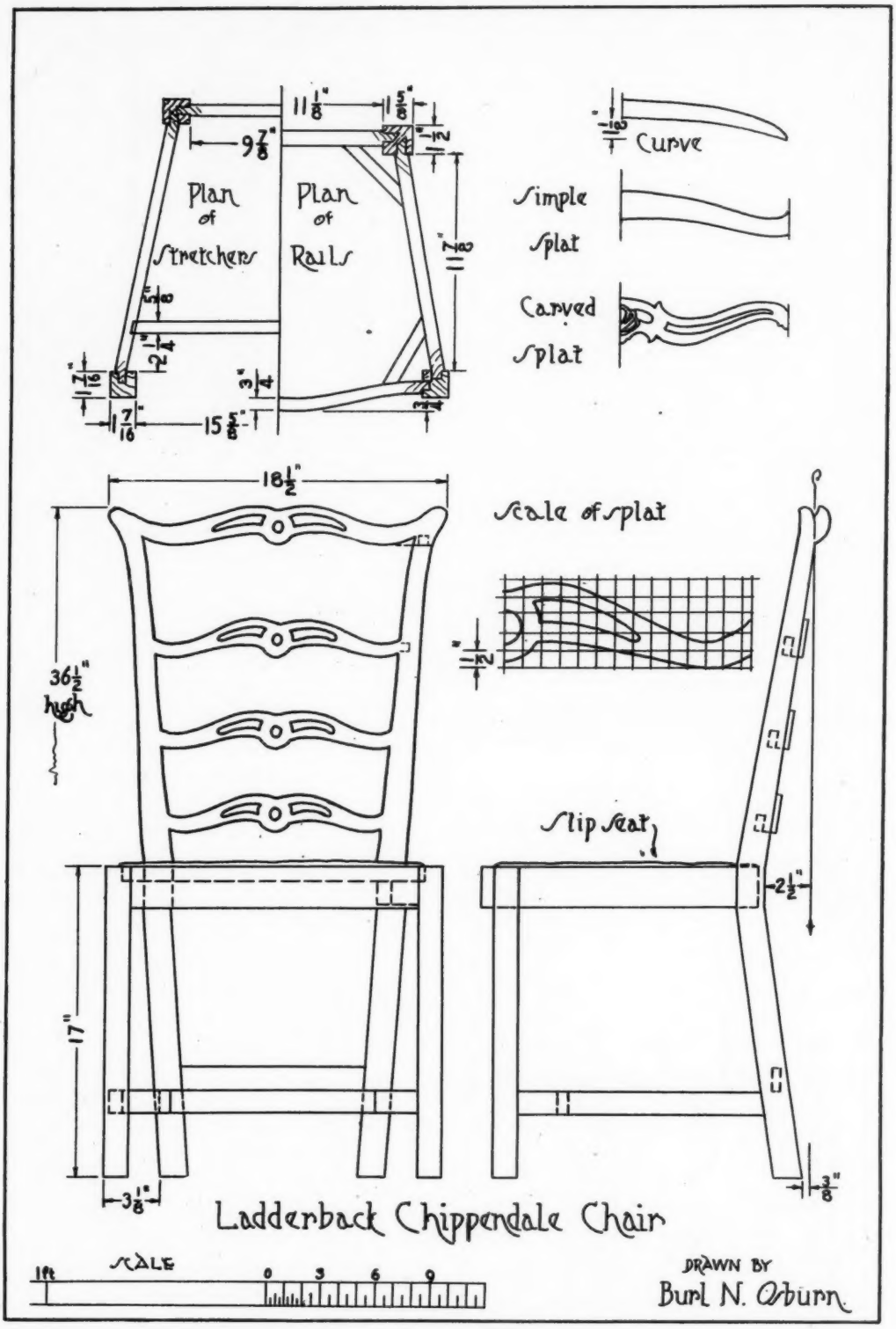
SPEAKERS' STAND.

Paul L. Cressman, Erie, Pa.

The speakers' stand was designed by a school architect. The cabinet trade class built one of these stands for the Academy High School, Erie, Pa. Its neat design is appreciated by all who have seen the stand.



Details of Toy Rocker.



Details for Making a Period Chair.

LADDERBACK CHIPPENDALE CHAIR

Burl N. Osburn, Sioux City, Iowa.

Thomas Chippendale lived, and did most of his work during what we call the "Georgian" period of art history. Perhaps his greatest claim to fame is in his chairs, which he developed to a degree never reached before or since by any designer. Many of his chairs are very elaborate and so far as schools are concerned, are of no interest, but a

few, including the ladderback here shown, are not only beautiful but practical.

This chair is the same as one at Mount Vernon, and the same as one formerly belonging to Capt. John Paul Jones with the exception that the Jones chair had but two splats in the back.

The chair derives its name from the form and arrangement of the splats forming the back. These are usually made in the manner of the one in the assembled drawing, but may be more elaborate or less so, depending on the desires of the maker.

The front legs are square and straight; the rear legs are slightly wider than deep, especially toward the bottom. Above the seat they are rounded on the back side.

The splats are flat in section, with the exception of the top one. The seat is of cloth or tapestry made to slip between the rails. It may be brought over the rails to form a full top.

The chairs should be constructed of mahogany, stained a deep red and varnished.

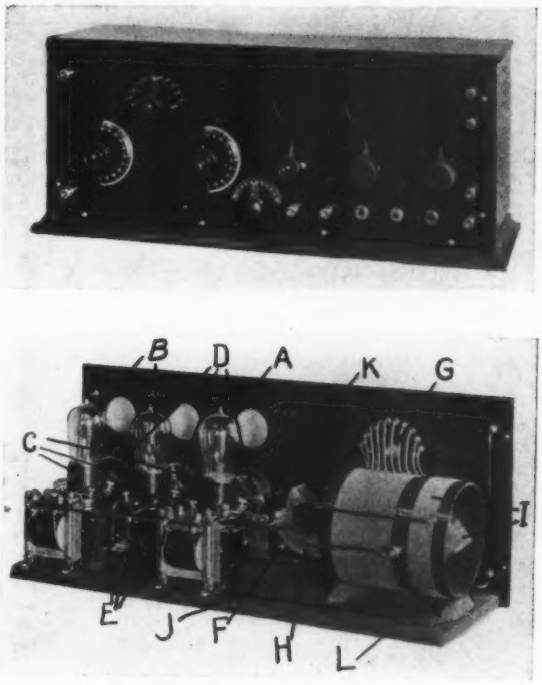
THE RADIOPHONE.

Arthur B. McCall, Mechanical Drawing Instructor, Springfield, Ill., High School.

The radiophone has grown in popular favor by leaps and bounds. While it is assumed that a year ago there were 50,000 radio receiving stations in the United States, one enthusiast has recently declared that there are at present fully one million sets in home use at the present time.

The set illustrated on this page was made by a student of the Springfield High School. It consists in part of devices bought from commercial sources and in part made up in the school shop. The whole set was assembled in the school shop and has given excellent satisfaction. The illustrated parts in the photograph are as follows:

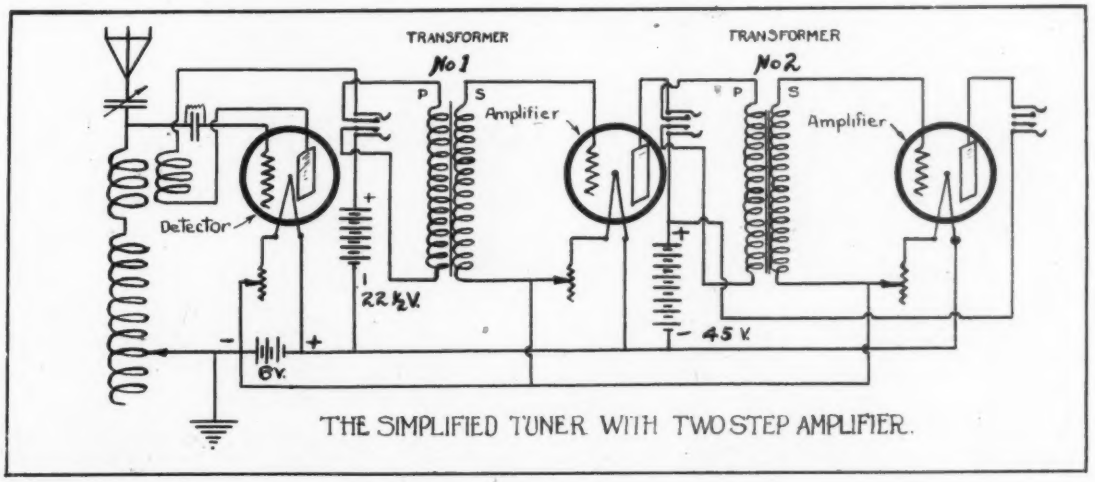
A—One U. V. 200 Radiotron detector tube.
B—Two U. V. 201 Radiotron Amplifying tubes.
C—Three V. T. tube sockets.
D—Rheostats—one Klosner vernier and two Remler Jr's.
E—Three Federal double circuit jacks.
F—One Potentiometer.
G—Two switch levers—1" radius, one for polentiometer and one for taps on the inductances (coils).
H—One 23 plate (Illinois) variable condenser (with vernier).
I—One fiber or cardboard tube size 4½ Dia. x 5" long (Primary) One fiber or cardboard tube size 3" Diam. x 2⅝" long (Tickler). Both coils to be wound in same direction with D. C. C. wire No. 22.
J—One piece of wood or fiber (shelf) size ⅛" x 2½" x 9".



Front and Back of Radiophone.

K—One Panel of (Formica or Bakelite) size 3/16" x 8" x 20".
L—One bottom board; size ½" x 6" x 19". (Secured to panel).
Two Jefferson or other good Amplifying Transformers.
Two pieces of brass, bent to support shelf for tubes.
Two Dials, 3"—one for tickler and one for condenser.
One combined grid leak and grid condenser.
Eight binding posts.
Ten switch points.
One-half pound of Double Cotton covered (D. C. C.) copper wire, No. 22.
One Cabinet—size: 20" long (outside), 7" from front to back, 8" high, not counting bottom of cabinet. The panel rests on a front extension of the bottom.

The hook-up of the instrument is the Armstrong and most of the parts are manufactured by the Radio Corporation of America.



Hook up used for making "Ted Mahan" Radiophone.

HOW THE TOOLS ARE CARED FOR IN ELLENSBURG HIGH SCHOOL.

Howard R. Porter, Ellensburg, Wash.

The method of handling tools in the shops of the Ellensburg high school is the outgrowth of several years experimenting along this line by the instructor. From the elementary attempts at orderly arrangement of tools on benches, through the various stages of unlocked drawers and wall cabinets to the present system of keeping all hand tools in a screened room, the experiences have been many and varied. Though by no means certain that the present arrangement is the last word on the subject, it has so far proved very satisfactory.

The tool room itself is rather larger than most rooms for that purpose, and if the shop were less commodious, would be restricted to smaller space. Under the circumstances, however, it has been permitted to double its area this year to include the instructor's office and to act in the added capacity of special store room. A mezzanine floor, or balcony, was constructed to make use of wasted vertical space, and such supplies as chair cane, choice veneers, shop patterns, leather, curled hair, etc., were stored upon it. All of the available space below this balcony is made use of in the disposal of tools, for everything except the hand screws and long door clamps is found within the screened walls.

A large rack contains twenty individual hand boxes of bench tools the latter reduced to the bare essentials, a jack plane, two foot rule, try square, marking gauge and back saw. The boxes are numbered to correspond with the benches, and each pupil asks for his number. It requires only a glance by the tool room man to see that all tools are in place when the boxes are handed in at the end of a class period. The window or wicket through which tools and boxes are passed has a zinc covered counter which allows boxes to slide easily. Near this window are grouped the general tools most called for, the chisels and bits most used, occupying a position similar to the double key board of an organ. The photograph makes the arrangement sufficiently clear. A tablet support at the right of the window carries a daily record sheet, with the names of each class followed by blanks spaces in which tools are listed as taken out and checked off as returned. Brass checks were lost or mislaid too regularly. Charges for screws and other hardware are made on separate slips and placed in a file.

A complete supply of small hardware such as nails, screws, angle irons, fasteners, etc., is kept in carefully labeled drawers.

Nails are handled out in the drawer so that the left overs are not scattered on bench or floor, glue, sand paper, stain, shellac and special tools such as plow, plane, expensive bits etc., are handed out only on presentation of a slip signed by the instructor.

Each pupil is given an individual plane bit which he keeps in his unfinished-work locker. These lockers are built in a double tier arrangement across one side of the main shop and are large enough (16″ x 16″ x 48″) to ordinarily accommodate the unassembled work of two pupils. Keys to these lockers are given out upon payment of a fifty cent deposit which is refunded when key is returned. The instructor has a master key that opens any of the lockers.

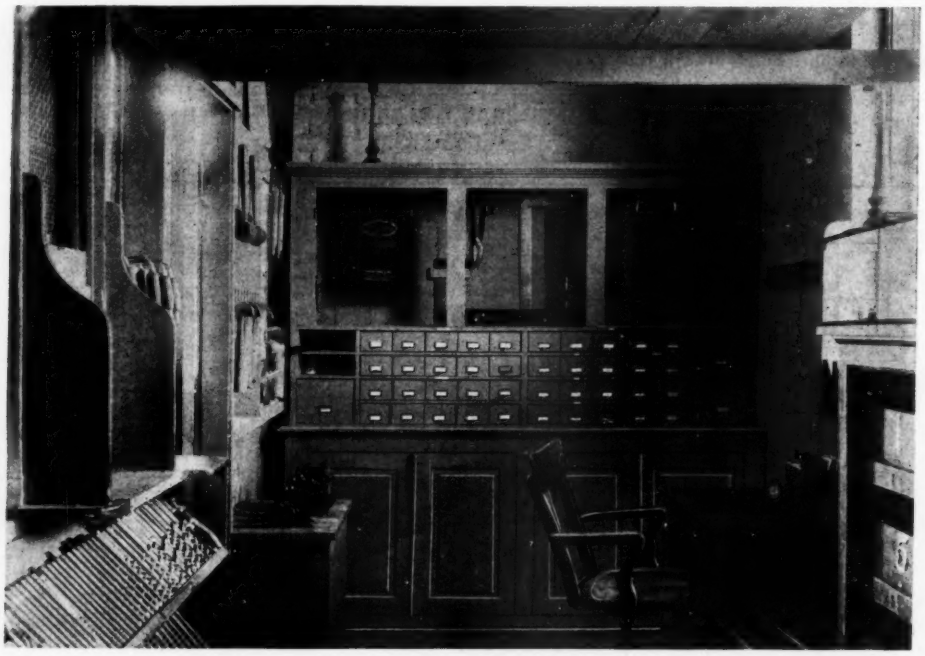
THE EDUCATIONAL VALUE OF A HIGH SCHOOL COURSE IN PRINTING.

R. R. Deimer, Instructor in Printing, Central High School, Aberdeen, South Dakota.

Any subject in a school curriculum which can justify itself from a motor standpoint as well as a cultural standpoint, and at the same time have both of these qualities working in harmony evidently fulfills its educational requirements.

Because printing is so closely and nearly connected with many phases of existence it makes itself a subject easily correlated with other branches of the school curriculum: Journalism, science, art, mechanics, psychology, history, mathematics, drawing, spelling, reading, writing, language, and composition all come within its scope.

The primary aim of a high school education is to educate and prepare for higher education. The junior high school is usually designated as a testing or finding place. From past experience it is known that the percentage of students stopping school at the close of the junior high period is in excess to those finishing the full high school course. If printing is taught with the sole idea of preparing the student for the commercial field, then, be-



Toolroom of the Ellensburg High School.

yond doubt, the course should come within reach of the students of the junior high school. If on the other hand, the course is given with the idea of appreciation foremost in mind it should be offered preferably to the students in the senior high school.

There is no one phase of endeavor with which we come so constantly in contact and with which we are so little acquainted as with the field of printing and its allied branches. The business man whether in the shop, restaurant, store, office, bank or school is called upon frequently to decide upon some form of printing. His knowledge of type faces, paper stock and inks and their proper relation to one another will do much to help him in a selection best suited for his commercial activity.

From a social viewpoint printing ranks one hundred per cent efficient. Practically every problem, if so desired, can be made a community project in which all students cooperate to a common end. All projects in the way of practical production offer unlimited possibilities in socialized efforts. The school paper, the school annual or year book, and all job work of a permanent nature stand forth as no other factor in the curriculum toward touching the life of the school, the interest of the home, or the usefulness of the school system more directly than does printing.

Printing so aptly named, "the art preservative" and "the mother of progress" ranks as fifth largest industry in the United States. One might acquire the ability of judgment as a result of familiarity with any endeavor but the judgment or taste of discriminating good printing from bad printing is made the more keen by actual practice and doing; by the process of creating.

Ideals along many educational lines are changing. Elite education in the times past was looked upon as a preparation that would assure the student a livelihood by means not requiring actual participation in manual lines, or in other words, living by brains alone. The time is coming, unless more rapid strides are taken in industrial education, when too many individuals will be endeavoring to live without producing or actually contributing to society. The time should be passing more rapidly when school means "sitting erect with eyes on book." This is an age of action and education must conform to the times. Boys must be taught to use their hands, they must be at work and doing things that have an ultimate value; a value that is readily comprehensible to them. Printing in schools conforms to all these requirements as well as educating along the line of intelligent consumption and practical production of the finished product.

A SUCCESSFUL EVENING VOCATIONAL SCHOOL.

The Effective Work Done at Casper, Wyo.

Vocational night school classes being conducted at Casper, Wyoming under the general or state supervision of J. R. Coxen, state director of vocational education and the local supervision of J. W. Hoyer, director of industrial arts, have outstripped all competition in enrollment, and the night school at Casper is, therefore, the largest vocational night school in the state. This is a record of which the school authorities in Casper are very proud owing to the fact that this is only the second year that a night school has been conducted here.

Until last year it was not deemed advisable or even possible to conduct vocational night school classes in Casper on account of the peculiar local conditions. Its rapid growth has made it extremely hard to conduct the schools on account of the changing population. Casper is known as one of the greatest oil towns in the entire United States. It is extremely doubtful if there is another school district in the country which can point to a record of growth in the past ten years equalling School District No. 2, which is the Casper city district. In 1911 with a population of 2800, a school enrollment of 472 and fifteen teachers employed, there were two banks in the city with resources of $1,100,000 and the assessed valuation of the district was $2,369,394. In the fall of 1921 the population had grown to an estimated population of 25,000, with a school enrollment of 3,796 and over 150 teachers employed; the banking houses meanwhile having increased to seven with resources of over $11,000,000, and the assessed valuation of the district having shown the marvelous increase to $52,817,420. This phenomenal growth is very largely due to the discovery of oil in the nearby vicinity and the building of two very large refineries in the city of Casper, with plans going forward for another refinery to be built the coming spring.

Last year under the leadership of Superintendent of schools, A. A. Slade, night classes were organized in a few subjects for the first time, in spite of predictions that the people were not interested in night school work and that they would not attend. There was a very generous response from the men employed in the refineries and the work given was very successful and much appreciated. With the day school enrollment jumping about 50 per cent in the grade schools and 100 per cent in the high school and the necessity of providing more buildings to take care of the large increase in the number of students, Mr. Slade found it impossible to look after the night school this year. In the last two years six new buildings valued at $650,000, including a new $250,000 vocational high school building, have been erected and even these new buildings do not adequately take care of the students. In employing the director of industrial arts for the city school system this year, one of the requirements of applicants was the ability to organize and supervise this vocational night school work in addition to the industrial work of the day school. From a large number of applicants, J. W. Hoyer, for the past three years director of the industrial arts department of the Northern Normal and Industrial School

J. C. WRIGHT.

MR. WRIGHT BECOMES FEDERAL DIRECTOR

Mr. John Calvin Wright, who has been employed by the Federal Board of Vocational Education for several years as a special agent, has been elected Director of the Board to succeed L. H. Carris.

Mr. Wright was born in Indiana but moved with his parents to Kansas when a small child. He was educated in the schools of Kansas and was graduated from the Kansas State Normal School. He also holds degrees given by the University of Missouri in 1918 and 1919.

Following his graduation, Mr. Wright taught in the schools of Kansas, later going to Kansas City, Mo., as a teacher in the high school. He served as a director of vocational training at Kansas City during the period from 1913 to 1918. In 1917 he was employed by the Federal Board as assistant director of trade and industrial education and in 1918 he was in charge of war training courses for the board. Mr. Wright prepared and supervised the preparation of a number of courses for the training of war veterans disabled in the world war.

at Aberdeen, S. D., was elected to the position and has been in charge of the night school work this year. Under his supervision the vocational night school classes were organized and are being conducted. These classes met with an immediate response and widespread enthusiasm and appreciation, and the co-operation which is being received from various sources indicates that this night school training will be a great success this year. In this, the second year that classes in vocational training are being offered by Casper schools, an increase of almost one hundred per cent over the enrollment of a year ago has been reached.

As stated above, Casper being an "oil town," the classes which were organized had to meet much more peculiar and special conditions than are found in the average city of 25,000. Many special classes are offered here which will be found only in an oil region. Even the work in such classes as blue-print reading and mathematics have special conditions and problems to meet in this section. Another strange condition is the very small number of foreigners in the city. Recent reports show about one per cent of the population to be foreigners, while the percentage of illiteracy is about 2/10 of one per cent for the city, consequently the English for foreigners and Americanization classes conducted under the same supervision as the vocational classes are rather small, but enthusiastically attended.

Vocational classes are conducted in three centers as follows: three classes in blue-print reading and shop sketching, two in use of the steel square, one in petroleum geology, one in petroleum chemistry, one in lay-out work for boilermakers, one in practical electricity, one in elementary mathematics, two in advanced shop mathematics, ing, two in millinery, one in English for foreigners, and one in Americanization, making a total of eighteen one in fundamentals of steam engineering, one in sewclasses with an enrollment of over 350. The problem of finding teachers for some of these classes was far from being a simple one, but through the co-operation of the officers and executives of the Standard Oil Co. and the Midwest Refining Co. employees of those companies were secured for the classes in petroleum geology, petroleum chemistry, layout work for boilermakers. electricity, steam engineering, blue-print reading, one of the advanced mathematics classes, and one of the classes in use of the steel square, while the other is taught by one of the contractors and builders of the city. The elementary mathematics and the other advanced mathematics are taught by vocational high school teachers. One of the millinery classes is taught by one of the domestic arts teachers while the other is under the supervision of a milliner. The sewing class is taught by a former domestic science teacher. The Americanization work is in charge of one of the successful attorneys of the city while the English for foreigners is being cared for by one of the special teachers of the city schools. All of these classes are organized under and meet the requirements of the Smith-Hughes law with the exception of the English for foreigners and the Americanization work. These two classes are organized under the State Americanization law and are also under the supervision of State Director J. R. Coxen.

SOLDERING.

Robert R. Decormier, Farmingdale, L. I., N. Y.

Soldering is interesting, easy to master, and with a little practice a degree of skill can be obtained. It offers the student an opportunity of extending the life of home utensils while learning and later after he leaves school. Boys in the country will find innumerable occasions when they will need a soldering iron—leaky milk pans, leaky automobile radiators, soldering of electric wire connections. The equipment represents but a small outlay. Two soldering irons sometimes called soldering coppers, will be sufficient. One half and one pound pointed coppers having been found the most useful. Forged coppers are to be preferred as they retain heat better than those which are cast.

Both stick and wire commercial solder known as "half and half" should be on hand. Wire solder requiring less heat to melt and is convenient to handle when small amounts are wanted.

A flux is used in soldering to prevent the oxidation of the metal and to help the solder to flow. The formation of oxide would come between the metal and solder and prevent a union. When soldering tin plate, bright copper, or lead, rosin is used, usually in a powdered form. Zinc chloride made by cutting muriatic acid with zinc is especially good for old work, it may be used for galvanized iron, zinc, copper, and brass. In soldering zinc or galvanized iron raw muriatic acid otherwise known as hydrochloric acid will give the best results. Powdered borax especially if made into a paste by the addition of water will do very fine work on brass, the solder sticking only where the flux is put. Judgment must be used with any of them; strong acids might injure the tool or work or both. Commercial soldering paste is a convenient flux but will not always do the work.

A gasoline torch is desirable for heating as it is a clean fire. The kitchen stove is unsatisfactory because it dirties the copper and is often at a distance from the work to be done.

Not only must one have a copper, heat, solder and flux—everything must be clean. The metal must be scraped until it is bright. The copper must be clean and well tinned.

Tinning the Copper.

There are two methods of tinning a copper, one being by the use of sal amoniac and the other by the use of rosin. In either case the copper must be clean. This is best done by fastening the copper securely in a vise and filing. When using sal amoniac, heat the copper which has been filed bright and further clean by rolling in sal amoniac. Next melt sufficient solder on the sal amoniac to cover the point. Tin point of copper by rolling it in the melted solder. If one desires to use rosin it will be necessary to select a soft building brick and scrape a channel in it one-eighth to one quarter inch deep. Leave the gritty substance in the channel, as it will help the process of tinning. After heating copper which has been previously cleaned, melt a piece of rosin about the size of a hen's egg in the channel. Add a piece of solder and roll the point of the copper in the bath of rosin, and solder until it is welled tinned.

Preparing Zinc Chloride.

Zinc chloride better known as cut acid is the flux most often used for repair work. A little care in its preparation will help the process of soldering. After selecting a clean glass container pour in some muriatic acid, diluting it with one-eighth to one quarter as much water. Drop in clean pieces of zinc; if they are not clean dip them in muriatic acid until they are, stir if necessary with a glass rod or piece of wood. Allow the zinc to remain until there is no further action. Strain using filter paper or several thicknesses of cheese cloth. Before using dilute with one or two parts of water.

Soldering a Hole in a Utensil.

It will be necessary to have the copper ready which means that it is clean and well tinned. While the copper is being heated, scrape around the hole until it is bright and swab with cut acid which is the flux to be used. The copper is hot enough when it will melt the solder readily. Place point of copper in the hole. This will raise the temperature of the metal which should be slightly below the melting point of the solder at the point to be soldered. Melt some solder around the copper, raise the copper and the solder will flow into the hole making a neat job.

Soldering An Old Seam.

The procedure is the same when soldering a hole; copper must be clean, heat, scrape along both sides of the seam and apply acid. Run copper along the seam following with the solder. The metal is heated by the copper as it goes along.

VOCATIONAL EDUCATION SOCIETY MEETING.

The regular monthly meeting of the Vocational Education Society of Boston was held at Hotel Avery, Saturday, May 13, President George F. Hatch presiding.

After luncheon President Hatch discussed the accomplishments of the Association during the past year, calling attention to the very excellent presentation of the most progressive ideas in education by the speakers during the meetings of the year.

At the conclusion of the reports of the standing committees, the following men were elected to membership:

Thomas Ashcroft, Asst. Instructor Massachusetts Institute of Technology.

John Boyan, Head of Division, Boston Continuation School.

Leon L. Chase, Special Assistant Mechanic Arts High School, Boston.

Walter F. Connolly, Senior Instructor, Boston Trade School.

Henry D. Fallona, Division Foreman, Boston Continuation School.

Patrick J. Fox, Shop Instructor, Boston Continuation School.

Earl R. Freeman, Prevocational Instructor, Boston Public Schools.

Raymond F. Higgins, Prevocational Instructor, Boston Public Schools.

Joseph A. Mahoney, Academic Instructor, Boston Continuation School.

John D. McLaughlin, Shop Instructor, Myles Standish Prevocational Center, Boston.

Vincent J. Readdy, Shop Instructor, Boston Continuation School.

Francis R. Sheehan, Shop Instructor, Boston Continuation School.

William C. Walsh, Special Asst., Mechanic Arts High School, Boston.

Robert W. Ford, Cooperative Instructor, Charlestown High School, Boston.

Charles R. O'Malley, Linotype Operator, Boston Telegram.

John Rice, Printing Instructor, John Hancock Life Insurance, Boston.

Daniel L. Kenselea, Head Dept. of Electricity, Mullane Engineering School, Boston.

The officers for the coming year were elected at this meeting. The following officers were elected:

President—Mr. M. Norcross Stratton, Agent-in-charge of Teacher Training, Vocational Division, Massachusetts Department of Education.

Vice-President—Mr. Frederick H. Sayer, Vice-Principal of the Boston Trade School.

Secretary—Mr. Maurice J. Moriarity, Coordinator of Cooperative Electrical Course, Charlestown High School.

Treasurer—Mr. Richard Benson, Junior Master Mechanic Arts High School.

Librarian—Mr. Martin L. Olson, Cooperative Instructor, Hyde Park High School.

It was decided to hold the June meeting at Kamp Kliff, Quincy, Mass. Pres. Hatch expressed the wish that the June meeting be made the banner meeting of the year, by having all the members who can possibly do so attend the outing.

The Program and Social Committees have been working hard to make the outing a very enjoyable and interesting meeting for all.—**Patrick J. Smith.**

DO YOUR PUPILS KNOW?

The above caption is the title of a most suggestive pamphlet just prepared by Mr. R. E. Dougherty, director of manual training for the schools of Louisville, Ky.

The pamphlet, which was printed in rather attractive style by the printing class of the Hiram Roberts grade school, contains more than 250 questions on topics related to manual arts, industrial processes, household articles, common principles in physics, mechanics, etc. The purpose is to give teachers of shop subjects, household arts, an appreciation of the inclusiveness of what may be considered the "related material" of manual and household arts and to suggest some of the useful information which may be imparted in an incidental way in the course of regular classwork. A typical page of the book is as follows:—

M. NORCROSS STRATTON

Agent in Charge of Teacher Training, Vocational Division, Massachusetts Department of Education.

Do Your Pupils Know—

The correct steps to be followed in planing a board to size?

The proper proportions of the different substances used in preparing spraying mixtures?

How sandpaper is made?

The qualities and uses of the various kinds of woods?

How to prepare two pieces of iron for welding?

How tools are tempered?

The size of the various openings in bird houses, needed for the various kinds of birds?

How to properly brace a gate?

How to use a dibble in transplanting plants?

How to use a framing square to determine the length of a rafter?

How telegraph messages are sent?

How houses are wired?

How to tell a rip saw from a cross cut saw?

Why doors are paneled?

How the monkey wrench received its name?

Where the cane used in caning chairs is obtained?

Foremanship Conference at Seattle. A foremanship conference was opened on May 15th at the plant of the Everett Pulp and Paper Company at Seattle, Wash., under the direction of Mr. George Henry Jensen. The work has been planned and will be conducted along the lines of the conference held at the plant of the Wheeler-Osgood Company at Tacoma.

Mr. Howarth, as president of the firm, addressed the foremen at the opening of the conference. In his talk, he brought out the fact that executive meetings had been held in the plant for many years with most practical benefits to the concern. In connection with this latest conference, it was the hope that it would result in better foremen and a better understanding of the foreman's duties and responsibilities. The conference, he held, is a means of broadening the views of the foreman and of creating a feeling of service and a desire to help the other man.

Mr. Howarth called attention to the need of a better understanding between employers and employees and to the necessity of the adoption of the golden rule and the recognition of the brotherhood of man. He held it to be important that the executives and foremen should create and maintain a feeling of loyalty.

Part-time Schools in Illinois. Part-time schools or classes are being conducted in the following Illinois cities: Aurora (east), Aurora (west), Bloomington, Chicago, Cicero, Galesburg, Granite City, Joliet, Peoria, Rockford, Springfield and Waukegan.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for subscribers who have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from competent authorities. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Florentine Ware.

277. Q:—Will you kindly advise as to the method of making Florentine ware. (Woodwork such as boxes, bowls, etc., bronzed (?) and hand-painted)? Can this be imitated on flower pots with gold paint as background? Also how a mottled effect is produced.—F. V. H.

A:—Florentine ware such as boxes, bowls and other ornamental work, can be prepared by producing a color ground as a base and laying thereon several varnish coatings which can be rubbed to a true surface. On this rubbed surface, the design may then be painted and if desired, can be protected by brushing on another coat of varnish, which also may be rubbed and polished. In the case of bronze effects the color ground should be prepared through the use of some hard drying flat white, tinted to imitate the color of the bronze and should be applied in as many coats as may be necessary to produce a hard, level surface. Over this the bronze coat can be applied as a brush coat and allowed to harden. A different effect can then be obtained by brushing on a thin coat of bronze liquid and when dry to the point of being tacky, should have the bronze powder sifted on it from a little cheesecloth bag and allowed to dry thoroughly. The excess bronze may then be brushed off and the whole given a starch coat of ordinary laundry starch, stirred up in cold water and brought to a thin, clear solution, by the addition of a small amount of boiling water. This should be applied with a soft camel's hair brush or fitch flowing brush and allowed to dry. This will produce an absolutely flat but very clear surface.

In the case of an attempt to imitate black lacquer work in the Japanese motif, an air drying black asphaltum of the turpentine type may be used to build up successive coats. A gentle heat for five to eight hours should be used with each coat by placing the box in a warm oven. Overheating should be avoided to prevent injury to the glue joints. The last coat should be rubbed out to a hard, bright surface with FF pumice stone, felt pad and water and after sponging and drying may have the design painted thereon. A clear coat of varnish may then be applied over the whole and when hard and dry, should be rubbed to a polish. The modern twenty-four hour drying Auto Enamels offer very fine mediums for this class of work, since the same kind of varnish can be purchased in the clear as is used in grinding the colored enamels. This point is of special value in the prevention of checking and cracking which results from the use of layers of dissimilar varnishes.

Mottled effects can be produced by blending several spots of colors separately on a piece of glass as in pallette practice and then a small piece of cheese cloth should be wadded up in such a manner as to present as ruffled a surface as possible. A small sponge cut from a coarse sheep's wool sponge is of benefit in this respect. Whichever is used, they should be first wrung out in water as dry as possible, in order to prevent the absorption of the oil or varnish from the colors used. By lightly pouncing the sponge or cheese cloth pad over the different colors on a glass plate a succession of mottlings will be produced which can be transferred to the objects through the use of a light pouncing motion at right angles to the surface, being worked upon. It is necessary that any rotary motion that would tend to mix these colors into an even shade should be avoided.

It is hardly practical to treat earthenware flower pots in the manner above described since it is impossible to grow plants successfully in any medium which excludes the air from the soil. Red earthenware pots form an ideal container for plants because of their great porosity which enables air to filter into the soil as the water evaporates. Where this condition is prevented, aeration ceases and the growth of the plant is hindered. Were it not for this one practical factor, the writer would long ago have put on the market a process whereby common earthenware pots could have been fired to produce a soft shade of sage green and eliminate the unpleasant redness of the common flower pot.

Any effect can be produced on the pots by giving them a varnish coat inside and out to seal the pores. Over this lay on a ground coat of flat white shaded to any desired color. From this point on any treatment can be given as outline above. This method, however, cannot be guaranteed as to permanency since the pot will invariably absorb moisture and blister the finish.—**Ralph G. Waring.**

Finish for Black Walnut Bedroom Set.

288. Q: We are making a seven piece bed room set in our shop, and would like your suggestion as to the proper finish to use. As this set is to be made of black walnut, and also will be on exhibit at the State Fair next fall, we wish to give it the best finish possible.—C. H. D.

A: A practical way of finishing seven piece bedroom set in walnut would be to sponge the wood thoroughly to raise the grain and open the pores. This will also tend to raise any bruises which have been missed in the first sanding. Sand clean with a 00 paper, apply a coat of Universal Brown water stain No. 200, 3 oz. to the gallon. Let dry and give a size coat or orange shellac which has been reduced one-half with denatured alcohol. Sand thoroughly with a split 0000 paper and make up a filler from silex, Van Dyke brown, burnt sienna and burnt umber to match the shade of the wood. Clean off carefully after applying, paying particular attention to corners and panel edges which can be cleaned more easily through the use of a hard wood stick sharpened to a skew chisel on one end and a rounded end on the other. Allow forty-eight hours for the filler to dry. If necessary, clean up with a slight sanding with a split 0000 paper. After dusting off the furniture should be cleaned up with a "tacky cloth" made from a piece of cheese cloth wrung dry after thoroughly saturating in varnish. Pieces may then be varnished with a good quality of floor varnish and when hard and dry should be sanded with a split 0000 paper in order to level up the foundation coat free from nibs and dust specks. The tacky cloth should then be used and a second coat of varnish applied. This may be repeated up to four coats with the last one rubbed out in FF pumice stone, felt pad and water.—**Ralph G. Waring.**

Lettering Pens.

304. Q: In the May issue you printed an article on "The Selection and Use of Lettering Pens." Will you kindly give me the address of the firms which have these pens for sale?—T. J. M.

A:—The following pens and their manufacturers are given as follows:

Hunt Bowl Point, C. Howard Hunt Pen Co., Camden, N. J.; **Payzant**, Keuffel & Esser Co., Hoboken, N. J.; **Spoonbill**, Prang Co., 1922 Calumet Ave., Chicago; **Speedball**, Gordon & George, Seattle, Wash., and Prang Co., Chicago; **Gillot's**, Jos. Gillot & Sons, 93 Chambers St., New York, N. Y.; **Esterbrook's**, Esterbrook Steel Pen Co., Brooklyn, N. Y.

Vocational Textbooks.

305. Q: I am interested in Mr. Rodger's article "Organization and Teaching of Industrial Subjects." From his bibliography, I am selecting a few books which I would like to obtain. Would you kindly give me the names of the publishers so that I might get them?—W. J. G.

A:—**Tolman's Hygiene for the Worker**, $0.50, American Book Co., New York, Chicago; **Rogers' Trade Foundations**, $1.25, G. M. Jones Co., Indianapolis, Ind.; **Gowin & Wheatley's Occupations**, $1.20, Ginn & Co., Boston, Mass.

The Expert Typist.

Exhibition of Portraits of American Indians. By W. Langdon Kihn, New York City. Conducted under the auspices of the Art Museum of Santa Fe, New Mexico, at the Anderson Galleries, Park Avenue and Fifty-ninth St., New York City. This pamphlet represents a collection of fine portraits together with important examples of ancient and modern pottery, blankets, jewelry, bead and leather work made by the Pueblo and Blackfeet Indians. The work is printed on a fine grade of paper well suited to the colored portraits which have been reproduced.